

For Tandy's 100  
200 and 600 Portables  
and 1000, 1200, 2000 and  
3000 MS-DOS Computers

# PCM

The Personal Computer Magazine  
for Tandy® Computer Users

Vol. III No. 9

March 1986

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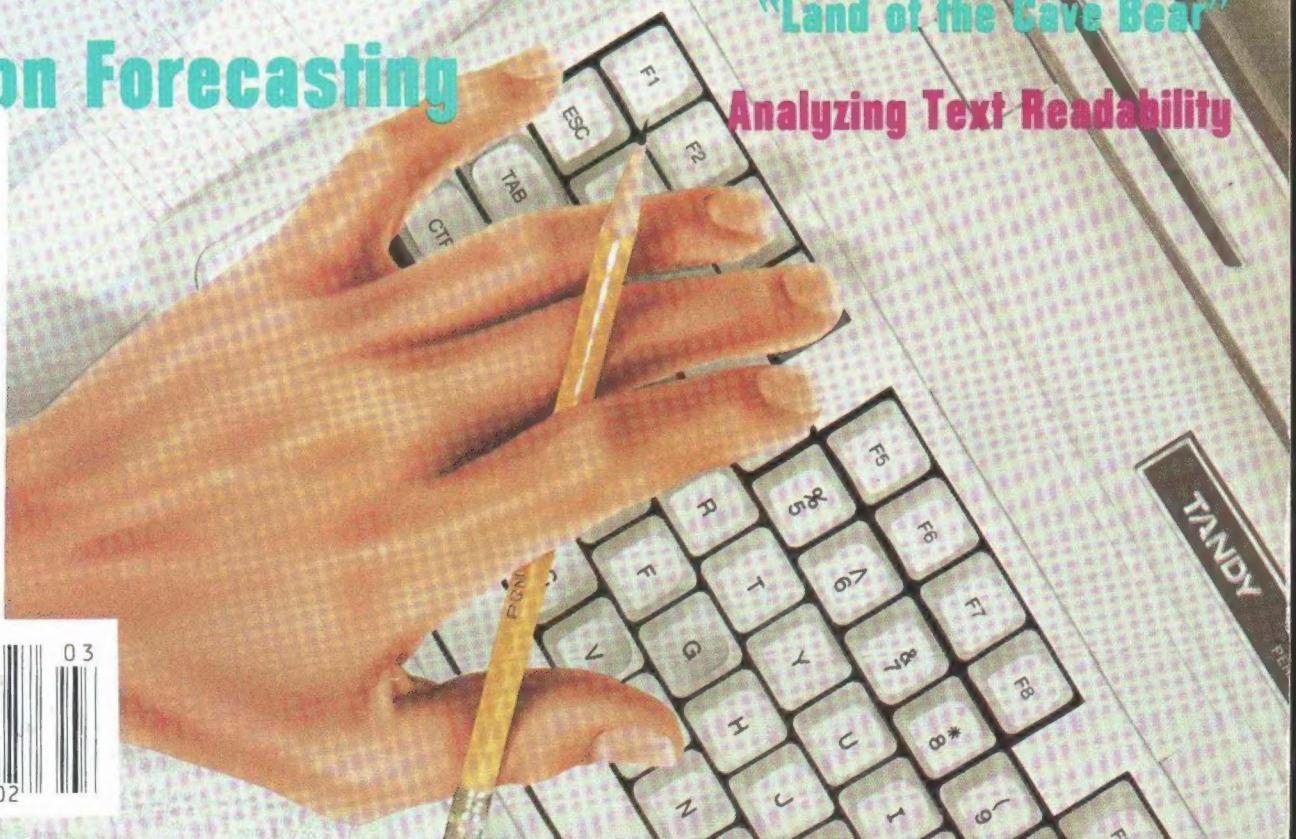
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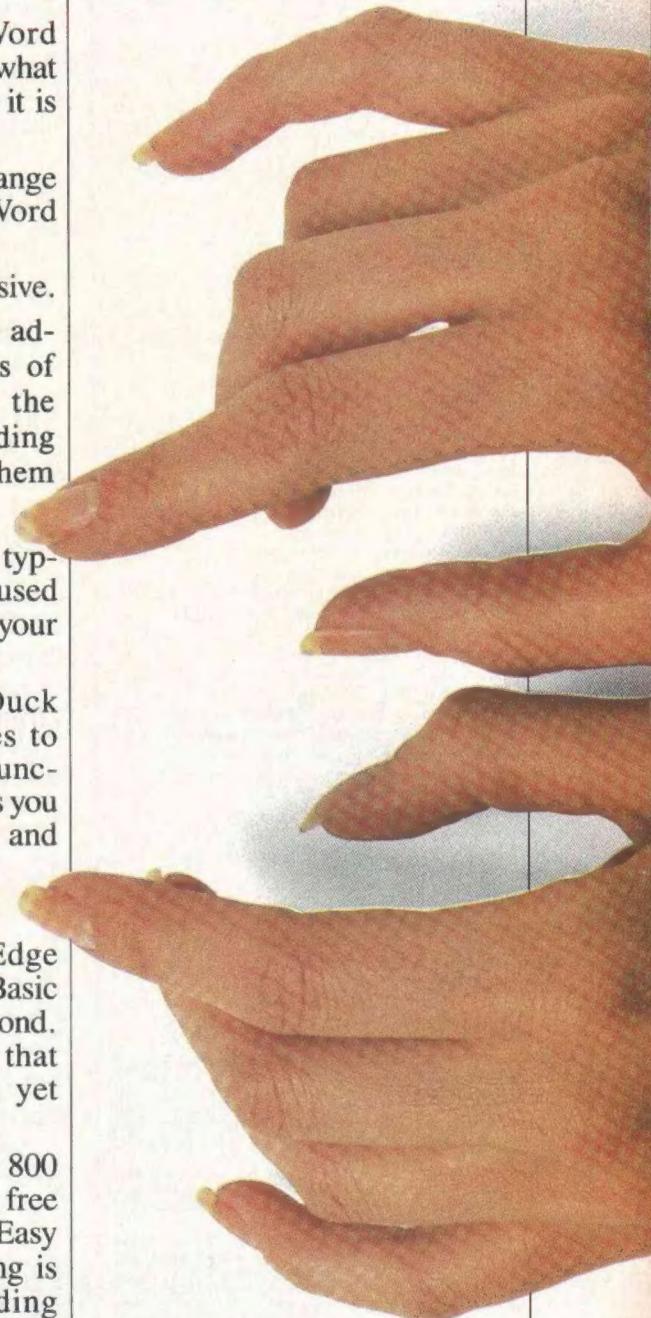
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Tandy MS-DOS Software Comparison Chart

|  | pfs*<br>File/Report | dBase™<br>II        | filePro 16<br>Smallware  |
|--|---------------------|---------------------|--|
| <b>GENERAL CHARACTERISTICS:</b>                                    |                     |                     |  |
| Menu driven  | yes                 | no                  | YES           |
| Allows user to create integrated business systems                  | no                  | programmer required | YES           |
| Developed systems and data can be moved to multi-user environments | no                  | no                  | YES           |
| Professional support available from the software's authors         | no                  | no                  | YES           |
| <b>PRICE</b>   | \$265               | \$595               | \$495  |
| <b>CAPACITIES:</b>   |                     |                     |  |
| Fields per record  | 100                 | 32                  | 999         |
| Characters per record  | 1679                | 1000                | 4608        |
| Records per file   | 1300                | 65535               | 16,000,000  |
| Indexes per file   | 1                   | 7                   | 12          |
| Number of digits per numeric field                                 | 20                  | 10                  | 24          |
| Number of files usable concurrently                                | 1                   | 2                   | 10          |
| Files span multiple drives   | no                  | no                  | up to 8     |
| <b>FEATURES:</b>   |                     |                     |  |
| Full-screen facility for creating custom screen layouts            | yes                 | no                  | YES         |
| Full-screen facility for creating custom report layouts            | no                  | no                  | YES         |
| Built-in field types (error checking)                              | no                  | 3                   | 12          |
| User-defined field types   | no                  | programmer required | 200         |
| Conditional math   | no                  | programmer required | YES         |
| User-defined menus   | no                  | programmer required | YES         |
| Change file layout without losing existing data                    | possible            | possible            | automatic   |
| Data protection  | no                  | programmer required | YES         |
| Password security  | no                  | programmer required | YES  |

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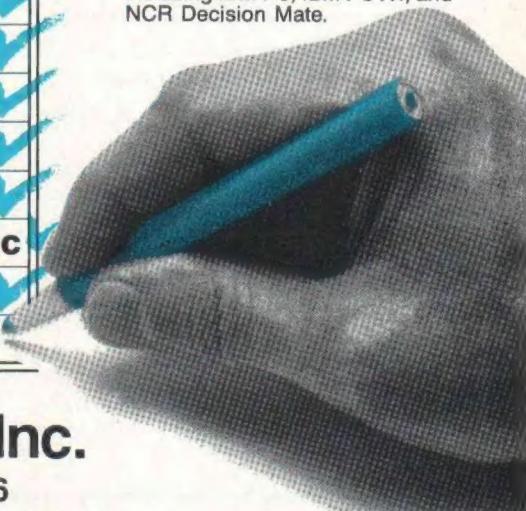
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# Putting the Consumer Electronics Show into Perspective

I recently stepped off the plane from Las Vegas where I attended the Winter Consumer Electronics Show, a five-day extravaganza that seems to crowd so much electronic equipment into the Las Vegas Convention Center that there is at least one little LED glowing for every man, woman and child in North America.

It wasn't much more than a couple of days after the plane (a late TWA flight, as usual) deposited me back in 20-degree weather (it was 70-plus in Vegas) that I was blessed with picking up a syndicated column to read that WCES "proved" the personal home computer market had died.

Spare me the pundits.

I must read a zillion "computer columns" and newsletters every month. And it seems everyone has a different interpretation. Of just about everything. In case you are unfortunate enough to have this same pair of clowns appear in your local paper, I think it is important to put WCES into perspective.

The first WCES I attended was some four years ago and I was amazed by all the electronic gadgets. Thanks to some friends at Antenna Electronics (a RAINBOW, PCM's sister publication, advertiser at the time), I actually got a decent room and some help finding my way around. But at the time, I bemoaned the lack of computers at the show and the fact that Tandy was "missing" from the list of exhibitors.

True again this year, there were few computer companies showing products and no Tandy. How come?

Well, if you want to go to a computer show, try COMDEX or NCC. If you want to buy stereos, CD players, TVs and VCRs, go to CES. (You can also buy more electronic doo-dads there, and some interesting watches, too, than in any other place on earth.) But if you want computers, don't try CES.

I took special note of the "distributors" and "retailers" at the show (it is easy, everyone is color-coded by name badge). As Ivory Soap says, 99 and 44/100 percent of them were from video and audio outlets.

And why no Tandy? Simple: CES is a show open only "to the trade." (They have signs to that effect.) Tandy, with its worldwide network of stores (did you know there are more Radio Shack stores than McDonalds?) doesn't need to sell to dealers. It sells to itself. And then to you.

(A footnote: Yes, Tandy people certainly *were* there. Usually they blanket the show looking for products they might want to private-label. This year was no exception.)

I am tired of pundits who don't know the difference between CES, NCC and COMDEX making "learned observations" based on bad data. Computer people have a term for it — "GIGO — Garbage In, Garbage Out." Oh well, they have to have something to write about and they probably were tired of talking about CD ROMs.

I wish someone, somewhere, with some expertise, would somehow convince some big syndicate to let them write a column about computers. It sure would clear the air. Most of what I read in what is called the "popular press" appears to be little more than a preconceived notion on which the writer or

writers try to find a few facts on which to hang them.

One of the nicest things about being in Vegas is, believe it or not, the cab drivers. In three to four trips there a year, I have met only one surly fellow out of a whole raft of trips all over town.

At CES I met Murray Rosner, who drives a cab but also writes a "taxi column" for the *Vegas Visitor*, one of those free newspapers that tells what's going on. Murray's column about COMDEX, I think, illustrates my point about the difference between the two shows and I'd like to quote something he said here:

"Every year when COMDEX arrives, a new word or phrase enters our vocabulary. In years past, there was 'state-of-the-art,' meaning the highest technically advanced. Then there was 'artificial intelligence.' Everybody used that term, but I couldn't get a clear definition from a soul.

"Last year it was 'IBM compatible.' That simply meant all programs were to be standardized, a blessing to both software manufacturers and dealers. This year it's 'VAR,' or Value Added Retailer. Then there's 'user friendly,' which means you won't panic when you sit down in front of the machine.

"There is no humor in this report because my kid just put down a deposit on a 'user friendly,' 'state-of-the-art' 'IBM compatible' computer from a 'VAR' and expects me to pay the balance — a classic case of 'artificial intelligence' on his part."

Final footnote: Did you know that Tandy sold more 1000s in the last quarter than IBM sold PCs? Does this mean people are finally getting smarter?

— Lonnie Falk

Also from the publishers of PCM . . .

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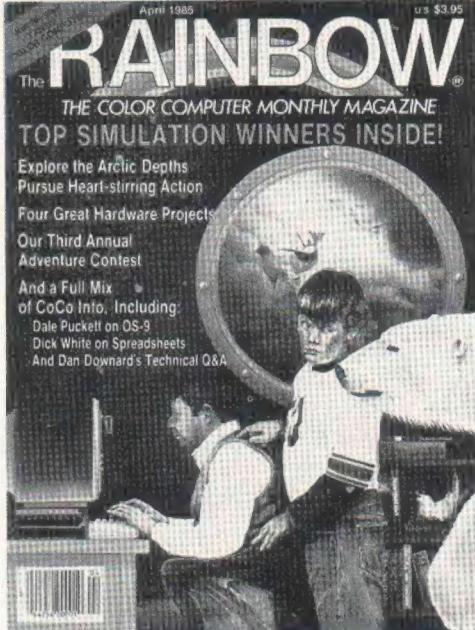
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In order to hold down non-editorial costs, we do not bill.

**NEW MS-DOS***Editor:*

The August issue of PCM referred to a new BASIC and a reversed MS-DOS for the Tandy 1000. My local Radio Shack store doesn't know anything about this and Computer Plus says they simply ship the latest revision. How can you tell if and when these changes are available? Will the BASIC and MS-DOS manuals, which are available separately, also be updated?

N.J. Wilkaitis  
Energy, IL

*Tandy has just released a new version of MS-DOS and BASIC for the Tandy 1000. The latest MS-DOS version is 2.11.22, and the latest BASIC version is 1.01.00. This upgrade may be obtained by contacting your local Radio Shack and making arrangements to bring in your original MS-DOS diskette and having the new version copied onto it.*

*When there is a product upgrade that Tandy classifies as "required," they notify all registered users of the product. It is therefore important, according to Tandy, to complete and mail all software registration cards as soon as you open the product package.*

**1000/1200 COMPATIBILITY***Editor:*

I am the happy owner of a Tandy 1200. I have several friends who have the Tandy 1000; sometimes programs that run on my computer will not run on the 1000. I've also noticed that you often list programs for the 1000, but sometimes they are not rated for the 1200 as well. Since the 1000 is an IBM compatible as is the 1200HD, what is the difference between the two computers?

Larry Roberts  
Lansing, MI

*It is rare to find software that runs on a Tandy 1200 that will not also run on a Tandy 1000. This is usually due to the differences in*

*the keyboard on the Tandy 1000 or its lack of support for the standard IBM monochrome adapter.*

*It is quite common, however, to find software written for the Tandy 1000 that will not function on the 1200. Since the Tandy 1000 supports more graphics and sound modes than the IBM PC or the Tandy 1200, software that uses these extended features, such as many programs listed in PCM, will not run on the Tandy 1200.*

*To determine if a program is going to run on your computer or not, look for your computer's model number in the upper right-hand corner of the lead page for the article.*

**DELPHI QUESTIONS***Editor:*

I am writing to obtain additional information on Delphi.

I am a new computer user and have a limited knowledge of what they can do. However, I do want to learn all I can and I find the operation fascinating.

Just what is available on Uninet, Tymnet, etc.? What are the charges? What does it cost to join?

Thomas A. Larsen  
Carmel, CA

*Delphi is a computer information service, whereas Uninet and Tymnet are simply there to provide a communications link between your local telephone and the Delphi computers in Boston. You can think of Uninet and Tymnet as you would a telephone company. They are just a connection between you and the person you're talking with.*

*Delphi offers many services such as electronic shopping, news and weather, electronic mail and, of course, the PCM-sponsored MS-DOS Special Interest Group. In the MS-DOS group, you can find new software, share ideas and questions with other users, and perhaps learn a little more about the computer you're using. In addition, there are other groups*

*for different special interests that you might find interesting.*

**PASCAL PROPOSANT***Editor:*

I recently purchased a Tandy 1000 computer through a mail order source. I saved over \$320 just by paging through your magazine one day at a newstand and discovering their ad. By the way, I never would have discovered this mail order store or any other "non-Tandy" product source, had I picked up a copy of your magazine as sold at one of my local Radio Shack Computer Centers, but that is worthy of another letter.

I just wanted to congratulate you on what seems to be one of the highest quality "dedicated" computer magazines I have ever seen. I found all of your articles to be interesting and informative. I was also pleased to see how many third-party companies are actively supporting Tandy's MS-DOS line.

But the thing that really spurred me to buy your magazine, and write this letter, was the fact that I am a *Turbo PASCAL* devotee. This marks the first time I have ever seen a magazine publish a program written in this terrific language. Now I will admit that before I purchased my Tandy 1000, I really didn't pay too much attention to the types of programs that were in magazines, but *Turbo PASCAL* programs must be few and far between. So you can imagine my surprise when I found two programs written in this language in just one issue of your magazine. That convinced me that PCM would be the magazine for me.

Please extend my thanks to the authors of these two programs in your January issue, Rick Boozer and John Harrell.

James K. Roth-Roffy  
St. Louis, MO

*Thanks for your kind words. We were frankly hesitant to print PASCAL programs, since not all users have access to a PASCAL compiler, but the response we've gotten from the two we published has inspired us to keep at it.*

*OK PASCAL programming wizards out there, let's see what you have!*

## PORABLE PROTECTION PROBLEM

### Editor:

After examining my article "Portable Protection" (January 1986), I found a few bugs in Listing 2, FILCDR.BA. I have corrected the errors and the corrections are as follows:

Delete lines 80-140 and replace lines 80-100 with the following lines:

```
80 IFNOTE OF(1) THEND=D+1:A=ASC
  (INPUT$(1,1)):B=ASC(MID$(C$0$,
  (DMOD8)+1,1)):C=AXORB1FC=00RC
  =260RC=127THENPRINT#2,CHR$(A)
  ::GOTO80ELSEPRINT#2,CHR$(C
  )::GOTO80
```

```
90 CLOSE1,2:IFTR=3THENKILLFI
 $:NAME"ZZZZZZ.D0"ASFI$
```

```
100 MAXFILES=0:MENU
```

Chris Miller  
Larchwood, IA

## PRINTER PROBLEM SOLVED

### Editor:

I would like to help answer a letter from a C.F. Thompson, Nelson, British Columbia, that appeared on Page 8 of your August 1985 edition.

I had the same trouble with double letters occasionally when a Tandy DMP-200 connected to my Tandy 1000. I bought both pieces, plus others, from a local Radio Shack dealer at the same time. I now have a 1000, two disk drives, 384K RAM, clock and calendar board, internal modem, DMP-200 printer and CM-2 monitor. I use *Multimate* mostly, some *DeskMate* and *pfs:Write* once in awhile.

When I reported this problem, the store manager knew nothing about it, but when I contacted the service man in the same building, he knew what was wrong. I have a very early model and apparently this same problem was experienced elsewhere. They made a change in the production. The printer pulse was marginally too long and sometimes the printer would reprint a character. There was a "Tech Tip," to modify the printer circuitry to let it trigger with the leading edge of the pulse

and not the entire pulse. That fixed it nicely.

When using *pfs:Write*, the printer would not print the text. But, strangely enough, it would print a message saying that it could not print.

David I. Smith  
Erie, PA

## OF TANDY AND PCM

### Editor:

I wish to bring to your attention a fairly trivial point in response to Lonnie Falk's statement ("LPRINT," December 1985): "... this marks the first time that John Roach ... has been featured on the cover of a computer magazine." I refer you to the cover of the December 1984 edition of *80 Micro*. Pictured alongside a then-new Tandy 1000 is Mr. Roach, in an (almost) identical pose (even wearing the same suitcoat!). In fact, the two pictures are so similar they could both have the same caption: "Why is this man smiling?" The answer being, of course, "You never know what we Texans have up our sleeves, do you?"

Indeed, if Tandy keeps up this pace of technological innovation and price reduction (as witnessed by the Models 100, 1000 and 1200), they may be able to regain much of the market share that they lost through mishandling earlier on. I believe Tandy has of late shown considerable willingness to mend its ways and, among other things, to be much more responsive to popular demand.

PCM has, since its onset, been a powerful force to this end, and should be given quite a bit of credit for providing the impetus for many of these changes.

Tandy still has a "way to go" to reach perfection for many of its policies, and hopefully PCM will be here for quite some time to provide a voice for all of us who wish to both applaud and criticize Tandy. (Although I hope less of the latter will need to be done.)

Many kudos to you for your article "In defense of BASIC" in the same issue — it echoed my feelings exactly. Despite having introduced millions of novices to the world of programming, and almost certainly making the computer revolu-

tion as such possible, BASIC is frowned upon by the proponents of all the wonderful structured languages such as PASCAL and C. But face it, like our wonderful, unglamorous Tandy computers, BASIC is a true workhorse that gets the job done with a minimum amount of time and effort, and is more than adequate for all but the most demanding tasks.

Mark D. Deavult  
Churchview, VA

## HOMEWORD HINTS

### Editor:

We are a two-person law office using a Tandy 1000 computer with dual disk drives. We use the Tandy *Homewood* word processing program.

We are very pleased with it and have come up with a way to get some symbols that we frequently use.

First, find the symbol you want in the column on the left. Next, depress and hold the ALT key while pressing the corresponding numbers in the right column on the numeric keyboard (do not use the numbers at the top of the alphanumeric keyboard).

You might or might not get a symbol like the one you want to print, but if in doubt, press F10 with the cursor over the symbol and see if the number displayed corresponds to the symbol you want.

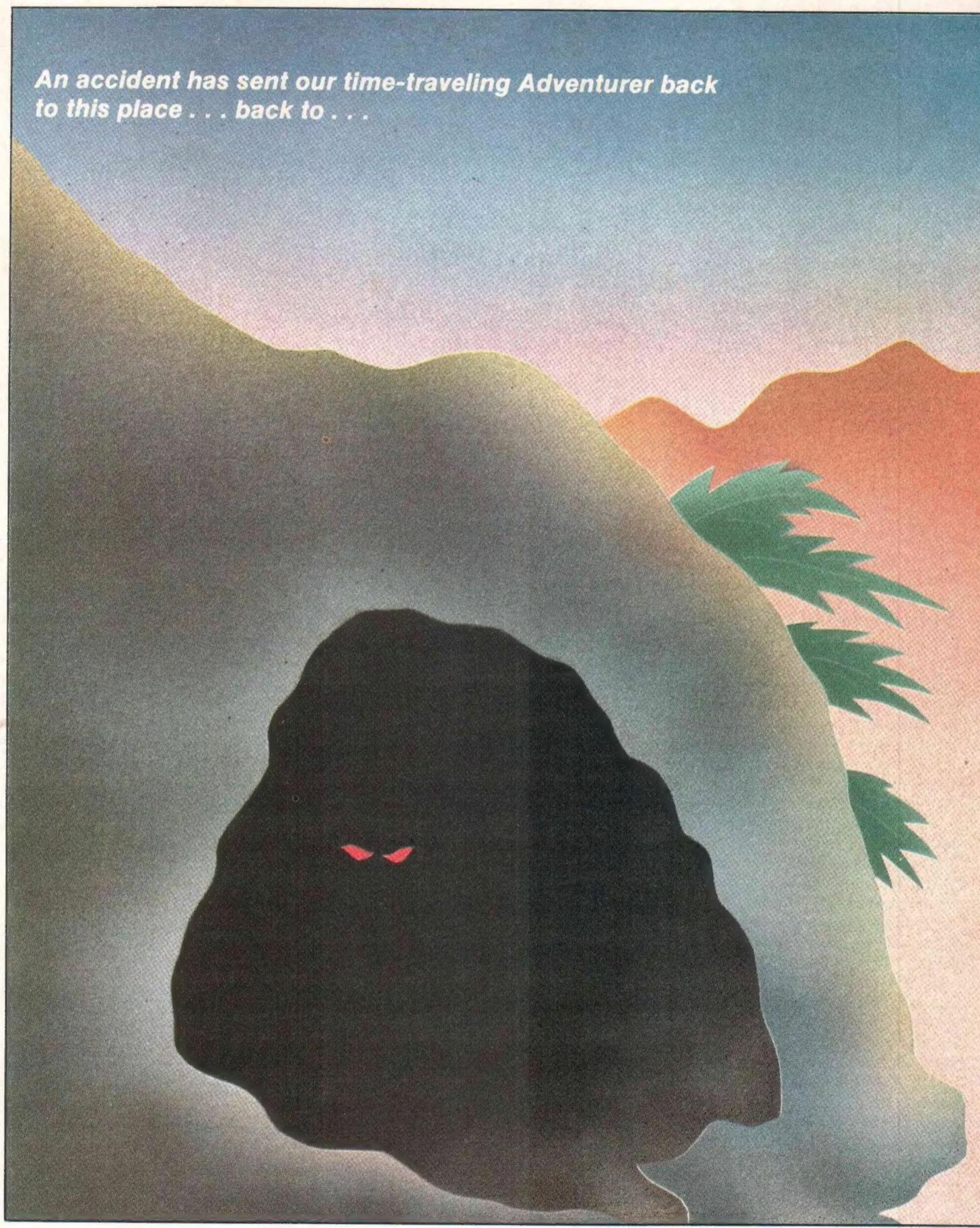
| Symbol | Number |
|--------|--------|
| §      | 192    |
| ¢      | 222    |
| ¼      | 172    |
| ¾      | 173    |
| ½      | 174    |
| ¶      | 175    |
| £      | 163    |
| °      | 166    |
| †      | 168    |
| ™      | 169    |
| ®      | 170    |
| ©      | 171    |

We enjoy your magazine, but we have not seen any articles on *Homewood*. We would love to see one, particularly detailing ways to use such things as the subscripts and superscripts that are used for footnotes.

Dan Gilbert  
New Orleans, LA



*An accident has sent our time-traveling Adventurer back to this place . . . back to . . .*



# The Land of the Cave Bear



By Leonard Hyre

Not long after I discovered how handy a computer can be, I stumbled through my first Adventure. When the quest was achieved (escaping from a derelict spaceship), the satisfaction I felt was immense. I was hooked from then on!

This Adventure, *The Land of the CAVE BEAR*, was written in hopes I could show some of my computing friends just what they were missing. I had in mind an Adventure that was unique and challenging, but at the same time it had to be fun. And more importantly, it had to be solvable in a reasonable amount of time, even for a novice.

As my collection of computers (my family's terminology!) grew, so did the rewrites and updates to *CAVE BEAR*. Now, with the Tandy 1000 on

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hand, I couldn't resist the upgrading of my old friend, the hapless Adventurer in *Land of the CAVE BEAR*.

*CAVE BEAR* takes place in the far distant past, 50,000 years B.C. The Neanderthal people populate the world, surrounded by strange and exotic beasts. An accident has sent our time traveling Adventurer back to this place. Your job is to stay alive and figure out how to get back to the present.

To solve the mystery, you guide the Adventurer with simple two-word commands, the first of which is a verb. For example, GET ROCK, GO SOUTH or COOK STEAK are all legal commands. The program will respond accordingly and appropriately (usually!). There are also a few single word commands, standard to most Adventures. An example is the word INVENTORY, to get a list of the items the Adventurer is carrying. Another is LOOK to get a description of the surroundings. All commands should be made in uppercase (caps key on), and two-word commands should be separated by a single space.

You may be interested in knowing how an Adventure works, or even may be contemplating

writing one yourself. I have tried to interlace *CAVE BEAR* with sufficient REM statements to lead you through the main sections of the program. Additionally, let me explain some of the main routines in detail.

The program starts out with an immediate jump to the title screen (GOTO 1960), a subroutine which in effect is like a separate small program. The first instruction, CLEAR,,, (32768) sets up enough work space for Screen 5 (medium-res with 16 colors). Using simple line and draw commands, a picture is drawn of a distant volcano. For dramatic effect, we see lightning strike with a distant crackle and roar. The name of the program and a credit to me (ego strokes) is given. To begin play, any key can be pressed. Until a key is pressed the program loops continuously through the striking lightning and thunder subroutine, Lines 2080 to 2210. Breaking out an earlier PCM and rereading Bill Barden's article on sound effects on the 1000, saved me much time here. Machine specific articles are invaluable as reference materials.

After a key is pressed the program proceeds to the "Scenario Screen." This sets up the events that lead up to the Adventure in time, telling the user what led to the accident and giving some clues as to how they (the users) may get back to the present. The scenario scene encompasses lines 2210-2340. Pressing any key here sends the traveler plunging into prehistoric terror. The traveler watches the years recede to a distant 50,000 years B.C. (lines 2380-2450).

Now, after our short diversion, the program proper begins execution with the RUN 140 command in Line 2450. At this time, we need to set up a bit of housekeeping, DIMensioning arrays and setting initializing values to various variables (lines 150 and 200).

When writing an Adventure, you must first decide on the events that will take place and, using them as a guide, draw a map of the rooms (locations) in the Adventure. You then place objects,

some needed and some not, in those locations. Now, you are armed for creating the Adventure itself.

The program must be able to control all of the above. Thus we must now READ in all of the DATA needed. Lines 240-500 list all the data statements. Type them carefully; a mistake here will result in errors showing up later in the program, a difficult situation to resolve. The statements are read by lines 420-690. An example of this would be Line 560, which reads in the rooms (locations) as P\$(C), the C ranging from 1 to 17. After reading them in, our program can identify locations by reference. The location C\$(1) is "A SHADED HILLSIDE PEPPERED WITH BUSHY COVER," the first piece of data encountered by Line 560.

The next routine, at Line 600, gets the description of each object to be found, a short version of the same and an initial location for each of the objects. For example, the DATA for this routine is contained in lines 340-400; thus the first object description is "REMAINS OF THE TIMECRAFT CRASH" and will be found at location 1, the "SHADED HILLSIDE." The short object description makes it easier to manipulate an item, as in GET ROPE instead of "GET BRAIDED ROPE OF INTERWOVEN VINE."

Possible directions of travel are the subject of the next routine, found at lines 640-650. Numbers representing all possible exits from the 17 locations are read in here. Of course, some exits are temporarily or permanently blocked, as required for story flow.

The list of possible verbs is added next (Line 690), giving a control number for each, C(C). This allows the program to jump to the proper routine within the program once a verb is determined.

Finally, actual play begins at Line 730. The first lines check on remaining "Strength Level," check for special conditions, tell us where the Adventurer is, what he sees and asks for the next

action. The ON A GOTO in Line 1070 sends the program off to the appropriate routine, based on the verb used.

The bulk of the program is made up of these individual routines. It is easy enough to follow through the logic. As an example, say the command is DROP ROPE, in which the verb "DROP" (4) sends the program to the fourth subroutine shown in the ON A GOTO; in other words, Line 1210. Here, a loop checks the user's input object (rope) against all known objects, and if a match is made, and the item is currently being carried (Location 1000), Line 1230 is executed and the object is dropped. If no match is made, Line 1250 explains "I don't have the rope."

A couple of tips may help you out. For directions of travel you can say GO SOU, GO NOR, GO EAS or GO WES. To see what you are carrying, type INV instead of INVENTORY. Most objects can be abbreviated by the first three letters of the word, an example being SAB for SABRETOOTH. One other thing ... *watch your strength* — even time travelers must eat and drink!

If you wish to avoid typing in the program, remember, it will be available on PCM ON DISK or Delphi's GROUP MSDOS board for a small fee. Also, if you prefer, you can send me \$8 and I will send you a copy on disk. My address is L.Hyre, P.O. Box 403, Cambridge, MD 21613. If you have any problems with *CAVE BEAR*, feel free to call me any evening after 5:00 p.m. EST at (301) 228-0064.

#### Tandy 1200 and 2000 Owners

The program, as written, is for the Model 1000. However, you should be able to create a working copy for either the Tandy 1200 or Tandy 2000 without much difficulty. The easiest way is to eliminate the title screen altogether by not typing in lines 1960 to 2200 and changing Line 100 to GOTO 2220. You may encounter other minor syntax problems, but nothing of a substantial nature. □

#### The listing:

```
1 '*****  
2 '*  
3 '*      Land of the CAVE BEAR      *  
4 '*  
5 '*      (C)  L. Hyre 1985      *  
6 '*  
7 '*      FOR THE TANDY 1000      *  
8 '*  
9 '*****
```

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```

100 GOTO 1960
110 '
120 ***** GO DRAW TITLE SCREEN *****
130 '
140 DEFINT S
150 DIM P$(18),OB$(29),B$(29),B(29),C$(29),C(29),T(4,17),T$(4),LD(6)
160 '
170 '
180 ***** SET INITIAL VALUES AND LIST DATA STATEMENTS *****
190 '
200 CLS:ZW=1:S=100:WT=0:BK=0:NX=0:M=1:L=1:CI=1:LD=0
210 '
220 ***** LOCATION DESCRIPTIONS *****
230 '
240 DATA A SHADED HILLSIDE PEPPERED WITH BUSHY COVER,AN OPEN MEADOWLAND WHERE ST
RANGE HERBIVORES GRAZE PEACEFULLY. HERE IS THE REST OF THE CRASH REMAINS - COVER
ED BY ROCK AND DEBRIS! (IF ONLY YOU HAD SOME DYNAMITE OR SOMETHING!)
250 DATA A STILL SMOKING VOLCANIC MOUNTAIN,A DIMLY LIT AND FOR-BODING WOODS. THE
RE'S NO SIGN OF LIFE AROUND.
260 DATA A FLINT OUTCROPPING ON A GRASSY KNOOL. THE FLINT SEEMS TO HAVE BEEN WO
RKED!,A BUSY WATERHOLE
270 DATA A SWAMPY HOLLOW WHERE A HERD OF MASTODON PLAYFULLY WALLOW IN THE MUCK,A
NEANDERTHAL CAMPsite. THERE ARE SIGNS OF VERY RECENT USE.
280 DATA RIDGE OVERLOOKING A HUGE SABRE TOOTH LION FEEDING ON A FRESHLY KILLED AN
TELOPE. A SOFT BREEZE BLOWS FROM THE EAST.,INSIDE A EERIE DARK CAVE ENTRANCE - A
GROWL IS HEARD... ,A NEANDERTHAL CAVE - DAMP AND COOL.
290 DATA A TINY SECRET CHAMBER LIT BY TORCH. IT IS PAINTED WITH STRANGE BEASTS BO
TH REAL AND IMAGINED,A NARROW PATHWAY ALONG A DEEP CREVICE,A THICK AND TOTALLY U
NPENETRABLE FOREST. YOU WOULDN'T WANT TO LINGER HERE.
300 DATA AN EXPANSIVE MARSHY BOG,A MOSQUITO INFESTED SWAMPLAND,A LARGE PLAINS AR
EA- FAR TOO LARGE TO SET OUT ON. A SULPHURIC CLOUD RISES FROM A FAR DISTANT VOL
CANO.
310 '
320 ***** OBJECT DESCRIPTIONS, OBJECTS, OBJECT LOCATION *****
330 '
340 DATA REMAINS OF THE TIMECRAFT CRASH,*,1,EMPTY CANTEEN,CANTEEN,1,THE CONTROL
PANEL,*,2,THE POWER CANISTER ---THE TIME DILATION LOCATER MISSING!,*,2,FLASHLIG
HT,FLASHLIGHT,2
350 DATA HARDENED LAVA FLOW,*,3,CRUSTY SULPHUR DEPOSITS,SULPHUR,3,BUSHES LADEN W
ITH RED BERRIES,BERRIES,4,MENACING LOOKING CLUB,CLUB,4
360 DATA POTASSIUM NITRATE DEPOSIT,POTASSIUM NITRATE,4,FLAKED SPEARHEADS,SPEARHE
ADS,5,BRAIDED ROPE OF INTERWOVEN VINE,ROPE,5,OLD HOLLOWED OUT LOG,LOG,6,FRUIT TR
EEs GROWING ALONG THE BANK. BABOONS ARE FEEDING ON THE FRUIT,FRUIT,6
370 DATA UGLY WARTHOG ROOTING UP THE EARTH,*,6,BRIGHTLY FEATHERED HOATZIN,*,14,M
ASTODON HERD,*,7, FIRE HARDENED SPEAR SHAFT,SHAFT,8,CHARCOAL EMBERS,CHARCOAL,8
380 DATA SABRE TOOTH LION,*,9,TASTY LOOKING ANTELOPE STEAKS,STEAKS,9
390 DATA CRAMPED NARROW PASSAGEWAY,*,11,YOUNG NEANDERTHAL WOMEN,*,11,A GNARLED O
LD MEDICINE MAN,*,11,A RING OF CAVE BEAR SKULLS,SKULLS,12,THE TIME DILATION LOCA
TER,LOCATER,12
400 DATA A DRIED ANIMAL SKIN,SKIN, 15,SMALL ROUNDED STONES,STONES,16,THOUSANDS O
F QUAGGA AND OTHER HERD ANIMALS,*,17
410 '
420 ***** EXITS FROM INDIVIDUAL LOCATIONS *****
430 '
440 DATA 0,4,2,0,0,5,0,1,0,-1,0,0,1,7,5,0,2,8,6,4,-1,0,14,5,4,16,8,0,5,15,9,7,0,
-3,10,8,17,0,0,9,10,0,13,9,13,0,0,0,12,0,11,0,0,0,6,8,0,0,16,7,0,15,0,0,10,0,0
450 '
460 ***** VERBS [ INCLUDING SINGLE WORD COMMANDS] *****
470 '

```

```

480 DATA INVENTORY,1,LOOK,2,VIEW,2,GET,3,TAKE,3,DROP,4,GO,5,KILL,6,HIT,6,ATTACK,
6,STAB,6
490 DATA EAT,7,DRINK,8,SWIM,9,MAKE,10,BUILD,11,COOK,12,LIGHT,13,FLOAT,14,ROW,14,
FILL,15,HELP,16,CRY,17,YELL,18
500 DATA SAY,19,LISTEN,20,LIFT,21,WEAR,22
510
520 ***** READ IN THE DATA *****
530
540 ***** READ IN PLACES *****
550
560 FOR C=1 TO 17:READ PS(C):NEXT C
570
580 ***** READ IN DESCRIPTIVE OBJECTS,OBJECTS,LOCATION OF OBJECTS *****
590
600 FOR C=1 TO 29:READ OB$(C),B$(C),B(C):NEXT C
610
620 ***** READ POSSIBLE EXITS FROM EACH LOCATION *****
630
640 FOR C=1 TO 17:READ T(1,C),T(2,C),T(3,C),T(4,C):NEXT C
650 T$(1)="NORTH":T$(2)="SOUTH":T$(3)="EAST":T$(4)="WEST"
660
670 ***** READ IN VERBS *****
680
690 FOR C=1 TO 28:READ CS(C),G(C):NEXT C
700
710 ***** ACTUAL PLAY BEGINS HERE *****
720
730 CLS:RD=INT(RND(1)*9)+1:S=S-RD:IF S>100 THEN S=100 ELSE IF S=<0 THEN 1810 ELS
E 740
740 CLS:WIDTH 80:COLOR 2,0:LOCATE 1,1,0:PRINT"STRENGTH LEVEL IS NOW ";S;:LOCATE
2,1:PRINT STRING$(80,"_");
750 IF CSRLIN>20 THEN GOSUB 1920
760 LOCATE 25,20:COLOR 6,0:PRINT"The Land of the CAVE BEAR!..... by L. Hyre";:C
OLOR 2,0
770 LOCATE 4,1,1:PRINT"YOU ARE AT ";PS(L)
780 IF L=10 AND LEFT$(OB$(20),3)="SAB" THEN B(20)=10
790 IF L=2 AND B(10)=1000 THEN B(10)=2:B$(10)="*":OB$(10)="POTASIUM NITRATE":LD=
LD-1
800 IF L=2 AND B(19)=1000 THEN B(19)=2:B$(19)="*":LD=LD-1
810 IF L=2 AND B(7)=1000 THEN B(7)=2:B$(7)="*":LD=LD-1
820 IF L=2 AND B(10)=2 AND B(19)=2 AND B(7)=2 THEN B(10)=0:B(19)=0:OB$(7)="EXPLO
SIVE"
830 IF L=2 AND B(26)=1000 THEN B(26)=2:LD=LD-1
840 IF L=2 AND B(7)=2 AND B(26)=2 AND OB$(7)="EXPLOSIVE" THEN 1780
850 IF CI=1 AND L=10 AND LEFT$(B$(20),2)="DE" THEN 1850
860 IF CI=2 THEN T(3,10)=0
870 IF CSRLIN>20 THEN GOSUB 1920 ELSE PRINT
880 PRINT"YOU SEE:"
890 FOR C=1 TO 29:IF B(C)=L THEN PRINT OB$(C);:;;
900 NEXT C
910 IF L=10 AND B(20)=10 AND LEFT$(OB$(20),3)="SAB" THEN 1820
920 IF CSRLIN>20 THEN GOSUB 1920 ELSE PRINT
930 PRINT"FROM HERE YOU CAN GO:"
940 FOR C=1 TO 4:IF T(C,L)<>0 THEN PRINT T$(C);:;;
950 NEXT
960 IF CSRLIN>20 THEN GOSUB 1920 ELSE PRINT
970 PRINT"WHAT NOW";:INPUT ACT$
980 FOR C=1 TO LEN(ACT$):IF MID$(ACT$,C,1)=" " THEN VRB$=LEFT$(ACT$,C-1):W$=MID$(ACT$,C+1,LEN(ACT$)-C):GOTO 1000 ELSE NEXT

```

```

990 VRB$=ACT$
1000 FOR C=1 TO 28
1010 IF LEFT$(C$(C),3)=LEFT$(VRB$,3) THEN A=C(C):GOTO 1070
1020 NEXT
1030 PRINT:PRINT"UH?":GOTO 960
1040 :
1050 ***** WHERE TO BRANCH AFTER DETERMINATION OF VERB *****
1060 :
1070 ON A GOTO 1090,1130,1140,1210,1280,1370,1440,1510,1540,1560,1590,1600,1610,
1630,1670,1690,1700,1710,1720,1730,1740,1750
1080 IF L=2 AND B(26)=1000 THEN OB$(26)="REPAIRED LOCATER":B$(26)="*":B(26)=0
1090 IF CSRLIN>20 THEN GOSUB 1920
1100 PRINT"I AM CARRYING:"
1110 FOR C=1 TO 29:IF B(C)=1000 THEN PRINT B$(C)
1120 NEXT:GOTO 960
1130 GOTO 730
1140 IF LD>4 THEN PRINT"I'M CARRYING TOO MUCH!":GOTO 960
1150 FOR C=1 TO 28:IF LEFT$(W$,3)=LEFT$(B$(C),3) AND B(C)=L AND B$(C)<>"*":THEN B
(C)=1000:PRINT"I GOT THE ";B$(C);":LD=LD+1:GOTO 960
1160 NEXT C
1170 IF LEFT$(W$,2)="SA"AND L=9 THEN PRINT"I GOT IT BUT I THINK IT WAS A ..BIG
GG!.. MISTAKE!":PRINT"IT'S EATING ME ALIVE!":FOR DL=1 TO 15:OUT &H38,DL+10:NEXT
:FOR DL=1 TO 2000:NEXT:PRINT"I'M DEAD ..":END
1180 IF LEFT$(W$,3)="WAR"AND L=6 AND ZW=1 THEN PRINT"I GOT ONE AND IT'S ONE UGLY
SUCKER! I LET IT GO.":ZW=ZW+1:GOTO 960
1190 IF ZW=2 AND LEFT$(W$,3)="WAR"AND L=6 THEN PRINT"YOU LEARN SLOW-DON'T YOU? I
'M BEING GORED TO DEATH!":GOTO 960
1200 PRINT"I CAN'T TAKE THAT!!":GOTO 960
1210 FOR C=1 TO 28
1220 IF NX=1 AND L=9 AND LEFT$(W$,2)="SP":THEN NX=2:GOTO 1260
1230 IF LEFT$(W$,3)=LEFT$(B$(C),3) AND B(C)=1000 THEN B(C)=L:PRINT"I DROPPED IT!
":LD=LD-1:GOTO 960
1240 NEXT
1250 PRINT"I DON'T HAVE THE ";W$:GOTO 960
1260 PRINT"YOUR SIGN OF PEACE IS RECOGNIZED":L=11:FOR D=1 TO 1100:NEXT:NX=2:T(2
,9)=11:GOTO 730
1270 GOTO 960
1280 FOR C=1 TO 4:IF LEFT$(W$,2)=LEFT$(T$(C),2) THEN DR=C:GOTO 1300
1290 NEXT C:GOTO 1360
1300 IF T(DR,L)>0 THEN L=T(DR,L):GOTO 1320
1310 IF T(DR,L)=0 THEN PRINT"CAN'T GO THAT WAY!":GOTO 960
1320 IF T(DR,L)=-1 THEN PRINT"A SLUGGISH RIVER BLOCKS THAT WAY":GOTO 960
1330 IF T(DR,L)=-3 AND LEFT$(OB$(20),3)="SAB" THEN 1820
1340 IF T(DR,L)=-2 THEN PRINT"A NEANDERTHAL CHIEF BRANDISHING A SPEAR BLOCKS YOU
PATH!":NX=1:GOTO 960
1350 GOTO 730
1360 PRINT"USE A DIRECTION!":GOTO 960
1370 IF L<>9 THEN 1380 ELSE IF L=9 AND LEFT$(W$,2)="SA"AND B(18)<>1000 OR B$(18)
<>"SPEAR":THEN PRINT"I WISH I HAD A SPEAR BUT I'LL GIVE IT A TRY":FOR DL=1 TO 300
:NEXT:PRINT"I'M GOING TO BE A SNACK FOR THIS GUY!":PRINT"I'M DEAD..":END
1380 IF LEFT$(W$,2)="BA"AND L=6 THEN PRINT"THEY'RE TOO CUTE FOR THAT!":GOTO 960
1390 IF LEFT$(W$,2)="SA"AND L=9 AND B$(18)="SPEAR"AND B(18)=1000 THEN PRINT"OK..
HERE GOES!":PRINT"I GOT'EM....I GOT'EM...!":FOR SW=1 TO 300:NEXT:OB$(20)="DEAD
SABRETOOTH":B$(20)="DEAD SABRETOOTH":T(2,9)=-2:ELSE 1410
1400 IF LEFT$(B$(20),3)="DEA":THEN P$(9)="A RIDGE OVERLOOKING A BLOODY FIELD.":GO
TO 960
1410 IF LEFT$(W$,2)="MA"AND L=7 THEN PRINT"NO WAY-FELLA! I MIGHT BE AN ADVENTURE
R BUT I'M NOT NUTS.":BEEP:GOTO 960
1420 IF L=9 AND LEFT$(W$,2)="CH" OR LEFT$(W$,3)="NEA":THEN PRINT"YOUR SPEAR PIERC

```

ES HIS CHEST! HE DIES-":FOR DL=1 TO 400:NEXT:PRINT"AND SO DO YOU. THIS MAN WAS Y  
OUR DIRECT ANCESTER!":BEEP:END

1430 PRINT"DON'T BE RIDICULOUS!":GOTO 960

1440 IF LEFT\$(OB\$(20),3) <> "DEA" THEN 1450 ELSE IF M=1 AND LEFT\$(W\$,3)="STE" OR LE  
FT\$(W\$,3)="ANT" AND L=9 AND LEFT\$(OB\$(20),3)="DEA" THEN PRINT"DELICIOUS! I REALLY  
NEED THAT PROTEIN.":S=100:OB\$(21)="ANTELOPE BONES":B\$(21)="\*":M=2:GOTO 960

1450 IF M=1 AND LEFT\$(W\$,3)="STE" AND L=9 AND LEFT\$(OB\$(20),2)="SA" THEN PRINT"TRY  
TO TAKE A SABRETOOTH'S DIN-DIN? NO WAY..PAL!":FOR DL=1 TO 800:NEXT:GOTO 960

1460 IF L=4 AND LEFT\$(W\$,2)="BE" THEN PRINT"NOT BAD.....":FOR DL=1 TO 600:NEXT  
:PRINT"KIND OF MAKES YOU WONDER WHY NO ANIMALS ARE EATING THEM!":FOR SW=1 TO 900  
:NEXT:PRINT"I'M POISONED!!!!":FOR DL=1 TO 300:NEXT:END

1470 IF LEFT\$(W\$,2)="FR" AND B(14)=1000 THEN PRINT"BABOONS KNOW WHAT PLANTS TO EA  
T. THESE ARE GREAT!":S=S+10:OB\$(14)="STRIPPED FRUIT TREES ALONG THE BANK. BABOONS  
SIT LAZILY SUNNING THEMSELVES":B\$(14)="SEEDS & PITS":B(14)=6:LD=LD-1:GOTO 960

1480 IF L=6 AND LEFT\$(W\$,2)="FR" AND B(14)=6 THEN PRINT"I CAN'T NOW!":GOTO 960

1490 IF L=9 AND M=2 AND LEFT\$(W\$,3)="STE" THEN PRINT"NOTHING LEFT THERE BUT VULTU  
RES PICKING THE SKELETON!":S=S-5:T(2,9)=-2:GOTO 960

1500 PRINT"I'M NOT EATING THAT!":GOTO 960

1510 IF B(2)=1000 AND WT=1 AND LEFT\$(W\$,2)="WA" OR LEFT\$(W\$,2)="CA" THEN S=S+20:PR  
INT"AAH! REFRESHING!":WT=0:OB\$(2)="DRAINED CANTEEN":LD=LD-1:O(2)=L:GOTO 960

1520 IF LEFT\$(W\$,2)="WA" AND WT=1 AND B(2) <> 1000 THEN PRINT"I DON'T HAVE A CANTEE  
N!":GOTO 960

1530 PRINT"THAT'S OUT OF THE QUESTION!":GOTO 960

1540 IF L=6 OR L=3 THEN CLS:PRINT"OK. I'M A GOOD SWIMMER, BUT I'M NOT SURE SWIMM  
ING IN AN UNKNOWN RIVER IS SMART.":FOR D=1 TO 1600:NEXT:PRINT"SOMETIMES THERE A  
RE CROCS IN THERE!..BLUB..BLUB..BLUB..!":END

1550 PRINT"I CAN'T SWIM THAT!":GOTO 960

1560 IF B(11)=1000 AND B(18)=1000 AND LEFT\$(W\$,3)="SPE" THEN PRINT"I'VE GOT A GOO  
D WEAPON NOW!":B(11)=0:B\$(18)="SPEAR":B(18)=1000:FOR DL=1 TO 600:NEXT:B\$(11)="\*  
":LD=LD-1:GOTO 730

1570 PRINT"I CAN'T MAKE A ";W\$

1580 GOTO 960

1590 PRINT"IF I TRIED TO BUILD THAT I WOULD PROBABLY ATTRACT THE WRONG KIND OF A  
TTENTION!":GOTO 960

1600 PRINT"THIS IS A MACHO ADVENTURE-----":FOR DL=1 TO 500:NEXT:PRINT" EAT  
IT 'RAW'":GOTO 960

1610 IF B(5)=1000 AND LEFT\$(B\$(18),2)="SP" AND B(18)=1000 AND LEFT\$(W\$,2)="FL" AND  
L=10 THEN PRINT"A CAVE BEAR IS BLINDED BY THE LIGHT....JUST LONG ENOUGH FOR Y  
OU TO RUSH IN AND STAB IT. YOU TAKE THE HEAD AS A TROPHY":BK=1:S=S+15:GOTO 9  
60

1620 PRINT"I CAN'T LIGHT A ";W\$:GOTO 960

1630 IF L=3 THEN 1640 ELSE IF L=6 AND W\$="LOG" OR W\$="BOAT" THEN PRINT"YOU FLOAT A  
CROSS THE RIVER. THE CROCODILES ARE UPSET THAT YOU DIDN'T SWIM!":L=3:B(13)=3:GOT  
O 1660

1640 IF L <> 3 THEN 1650 ELSE IF L=3 AND W\$="LOG" OR W\$="BOAT" THEN PRINT"YOU FLOAT  
ACROSS THE RIVER.":L=6:B(13)=6:GOTO 1660

1650 PRINT"YOU CAN'T FLOAT A ";W\$:GOTO 960

1660 FOR DL=1 TO 1000:NEXT:GOTO 730

1670 IF L=6 AND B(2)=1000 AND LEFT\$(W\$,2)="CA" THEN WT=1:B(2)=6:OB\$(2)="FULL CANT  
EEN":B\$(2)="CANTEEN":PRINT"I FILLED IT....":GOTO 960

1680 PRINT"THAT'S SILLY!":GOTO 960

1690 PRINT"HELP - YOU SAY!....IT WASN'T MY IDEA TO COME HERE IN THE FIRST PLACE  
!!!!":GOTO 960

1700 PRINT"SISSY!":GOTO 960

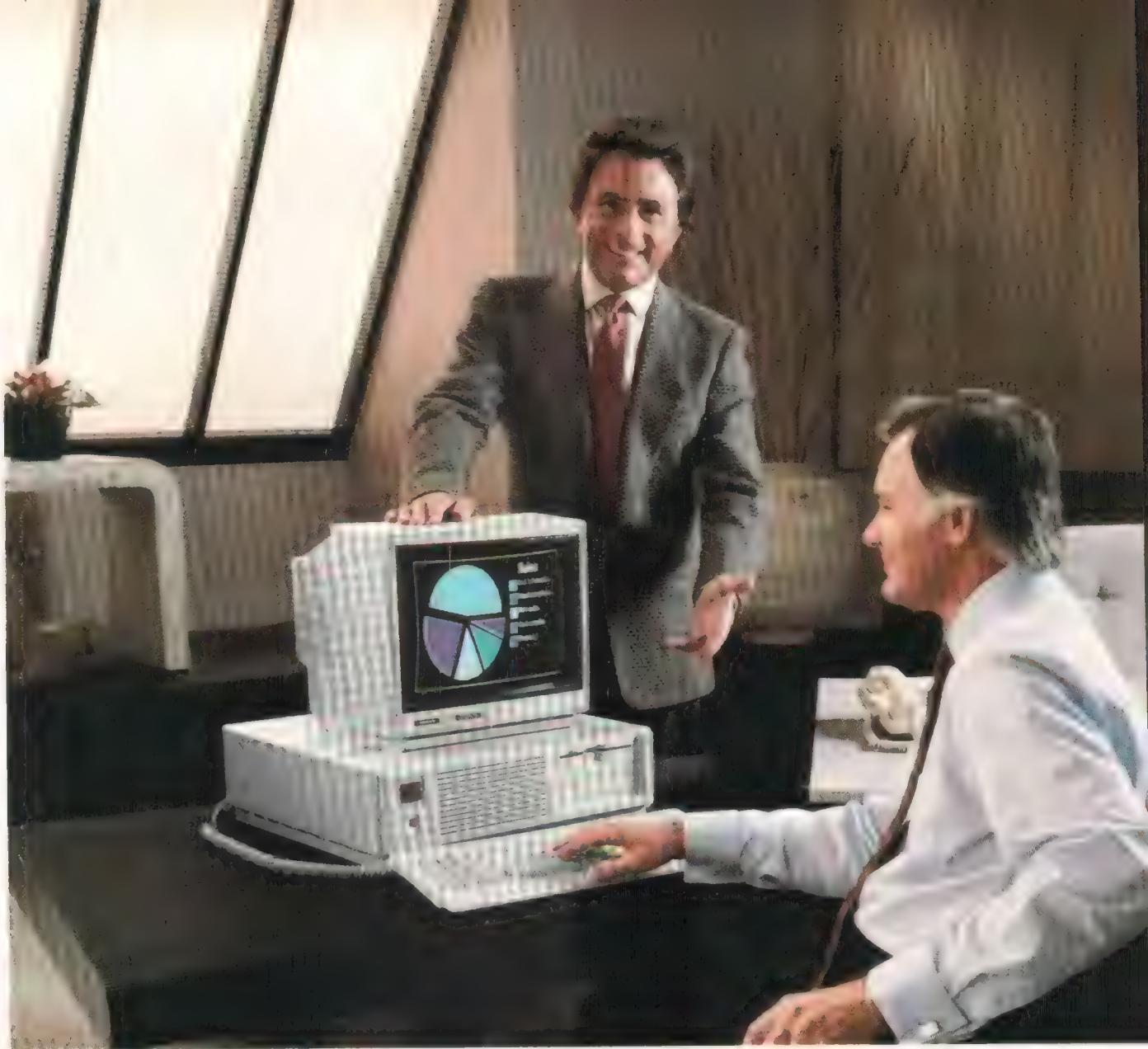
1710 PRINT"HELLOOOOOOO.....!":BEEP:GOTO 960

1720 PRINT"I SAID ' ";W\$;"':PRINT" BUT NOTHING HAPPENED!":GOTO 960

1730 PRINT"I HEAR THE BIRDS SINGING IN THE TREES. BIG DEAL!":GOTO 960

1740 PRINT"SORRY, I'VE JUST HAD A HERNIA OPERATION!":GOTO 960

1750 IF LEFT\$(W\$,2)="SK" AND B(27)=1000 THEN PRINT"I SURE LOOK SILLY IN THIS LITT



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LE SQUIRREL SKIN":LD=LD-1:FOR DL=1 TO 600:NEXT:B(27)=0:GOTO 960  
 1760 IF LEFT\$(W\$,2)="SK"AND B(27)<>1000 THEN PRINT"I DON'T HAVE THE SKIN":GOTO 960  
 1770 PRINT"WEAR WHAT????...NO WAY!":GOTO 960  
 1780 FOR DL=1 TO 1200:NEXT:CLS:PRINT:PRINT"YOU QUICKLY MAKE A GUNPOWDER MIXWITH  
 THE CHEMICALS YOU HAVE GATHERED. YOU USE IT TO BLAST AWAY THE ROCK DEBRIS. AFT  
 ER YOU INSTALL THE DILATION CONTROL"  
 1790 PRINT"THE TEAM OF RESEARCHERS IN THE 21ST CENTURY THEN LOCATE AND RESCUE YO  
 U.  
 YOU HAVE SURVIVED 'THE LAND OF THE CAVE BEAR'"  
 1800 PRINT"THE END";:END  
 1810 PRINT"YOUR STRENGTH DROPPED TO NOTHING AND YOU HAVE DIED!":PRINT"SUCH IS TH  
 E END OF A CARELESS ADVENTURER!":END  
 1820 PRINT:PRINT"YIPE!! A SABRETOOTH LION....":FOR DL=1 TO 1500:NEXT:PRINT"NEVER  
 GO UPWIND OF A LIVE SABRETOOTH LION!":PRINT:FOR DL=1 TO 1500:NEXT:PRINT"HE OBVI  
 OUSLY FOLLOWED YOU FROM THE SITE OF HIS KILL."  
 1830 FOR DL=1 TO 1500:NEXT::PRINT"HE POUNCES!!!!!!!!!!!!!!":FOR DL=1 TO 1  
 000:NEXT:PRINT"NOW YOU ARE HIS MAIN COURSE....":PRINT"THE END!"  
 1840 END  
 1850 INPUT"WANNA GO FARTHER IN";AN\$  
 1860 IF LEFT\$(AN\$,1)="Y"THEN 1870 ELSE 1880  
 1870 IF B(5)=1000 THEN CI=2:GOTO 960 ELSE IF B(5)<>1000 THEN PRINT"I CAN'T SEE I  
 N THE DARK!":FOR DL=1 TO 1000:PRINT"A CAVE BEAR HAS ME IN IT'S ARMS!IT'S ALL OVE  
 R.....PLEASE.....BE MORE CAREFUL WITH YOUR NEXT HAPLESS ADVENTURER!":END  
 1880 PRINT"WHEW!!! I WAS AFRAID YOU MIGHT TRY IT":CI=2:L=10:FOR DL=1 TO 1000:N  
 EXT::GOTO 730  
 1890 '  
 1900 \*\*\*\*\* WIPE SCREEN CLEAN [LEAVE STRENGTH LEVEL] \*\*\*\*\*  
 1910 '  
 1920 FOR WIPE=4 TO 24:LOCATE WIPE,1:PRINT STRING\$(80," ");:NEXT:LOCATE 25,1:PRIN  
 T STRING\$(79," ");:COLOR 6,0:LOCATE 25,20:PRINT"The Land of the CAVE BEAR!.....  
 by L. Hyre";:COLOR 2,0:LOCATE 4,1:RETURN  
 1930 '  
 1940 \*\*\*\*\* INITIAL TITLE SCREEN \*\*\*\*\*  
 1950 '  
 1960 CLEAR ,,(32768!)  
 1970 KEY OFF:SCREEN 5,1:LOCATE 1,1,0:CLS  
 1980 LINE(0,60)-(319,136),8,B:PAINT(2,62),8,8  
 1990 LINE(0,136)-(319,149),6,BF  
 2000 DRAW"BM1,135;C10R318u513h314L7H2L12H1G3H3L16H4L3G3L24G7H5L15H2F3H3L13H14L20  
 G16L5G3H6L12G2H2L3G3H4L8G2L2G2L2H2L5G3H4L9G3L3H2L15G3H2L5G5L9G1L5H2L5D7"  
 2010 PAINT(2,133),2,10  
 2020 CIRCLE(40,75),8,14:PAINT(40,75),14,14:CIRCLE(100,75),3,15,,,5:CIRCLE(104,7  
 8),4,15,,,8:CIRCLE(109,74),8,15,,,35:CIRCLE(115,76),7,15,,,4:PAINT(100,75),15  
 ,15:PAINT(116,77),15,15  
 2030 CIRCLE(240,80),4,15,,,5:CIRCLE(244,83),4,15,,,8:CIRCLE(250,78),8,15,,,35  
 :CIRCLE(255,82),7,15,,,4:PAINT(240,80),15,15:PAINT(255,82),15,15:PAINT(250,78),  
 8,15  
 2040 LOCATE 3,16:COLOR 4:PRINT"Land Of The":LOCATE 5,13:COLOR 14:PRINT"C A V E  
 B E A R"  
 2050 COLOR 15:LOCATE 21,16:PRINT"by L. Hyre  
 2060 COLOR 2:LOCATE 23,1:PRINT"Press ENTER to Begin....."  
 2070 LINE(50,10)-(275,44),14,B,&H5555  
 2080 AK\$=INKEY\$  
 2090 DRAW"BM109,80;C14G5R4G6R4G5"  
 2100 IF INT(RND(9)\*9)<7 THEN 2130  
 2110 OUT &H61,&H6C:OUT &HC0,&HE0+1\*4+0  
 2120 FOR I=1 TO 15:OUT &HC0,&HF0+I:NEXT I  
 2130 DRAW"bm109,80;c8g5r4g6r4g5"  
 2140 IF INT(RND(9)\*9)<6 AND AK\$=""THEN 2080

```

2150 DRAW"BM245,85;C14G8R5G8R3G8":DRAW"BM250,85;C14F6L7F9L5F8R4G8"
2160 OUT &H61,&H6C:OUT &HC0,&HE0+1*4+0
2170 FOR I=1 TO 15:OUT &HC0,&HF0+I:NEXT I
2180 DRAW"BM245,85;C8G8R5G8R3G8":DRAW"BM250,85;C8F6L7F9L5F8R4G8"
2190 FOR X=1 TO 1000:NEXT
2200 IF AK$=""THEN 2080
2210 ***** THE SCENARIO SCREEN *****
2220 KEY OFF:SCREEN 0,1:COLOR 0,2:WIDTH 80:CLS
2230 LOCATE 1,1:PRINT"The SCENARIO"
2240 LOCATE 3,1:PRINT"Year 2000...."
2250 LOCATE 7,1:PRINT"I awake....Where am I?...Now, it begins to come back. I wa
s out backpacking in the New Mexico desert when I chanced upon a strange machin
e. I approached it cautiously. On the side, an inscription read...."
2260 LOCATE 11,25:PRINT"NASA Time Shuttle EXPERIMENTAL":LOCATE 12,37:PRINT"DANGE
R"
2270 LOCATE 14,1:PRINT"Suddenly, it began to make strange noises!"
2280 LOCATE 15,1:PRINT"HUM..HUMM...HUMMM....HUMMM....HUMMM...."
2290 LOCATE 16,1:PRINT"I tried to get away. Too late! Things are spinning and fa
ding to black!"
2300 LOCATE 17,1:COLOR 9,0:PRINT STRING$(80," ");" BUT...Why do I have a vision
of 'Strange Hairy Men' carrying away something ? ";:COLOR 0,2
2310 LOCATE 19,1:PRINT STRING$(80," ");
2320 LOCATE 20,20:PRINT"[MEANWHILE....BACK AT NASA HEADQUARTERS!]
2330 LOCATE 21,1:PRINT"The TIME/CONTROL team tries desperately for a TIME-DILATI
ON Fix on the hapless and unsuspecting traveler. It is his only hope!"
2340 LOCATE 24,1:PRINT"PRESS ANY KEY to plunge into time!";
2350 '
2360 ***** SHOW THE REAL TIME GAUGE *****
2370 '
2380 AK$=INKEY$:IF AK$=""THEN 2380 ELSE COLOR 2,0:CLS
2390 WIDTH 40:COLOR 7,0:LOCATE 6,7:PRINT"Real Time Distortion Guage";
2400 FOR DG=-2000 TO (-48000!) STEP-2500
2410 LOCATE 4,17:PRINT DG;
2420 FOR DL=1 TO 200:NEXT
2430 NEXT DG
2440 LOCATE 4,12:COLOR 4:PRINT"50000 yrs. BC";
2450 FOR DL=1 TO 3000:NEXT:RUN 140

```

PCM



Pack BASIC programs to conserve precious memory

# Sardine

By Richard Ramella

**I**t's axiomatic — no matter how much memory your portable has, there's never enough to carry around all the information you need.

*Sardine* is a Model 100 utility program which helps alleviate the problem. It works on systems of 8K and up. It's a BASIC program which packs other BASIC programs into less space. A program compressed by *Sardine* stores in about 25 percent less memory space than its unpacked version. More text and BASIC file material can be carried in the system. Also, packed programs run about six percent faster than unpacked versions.

A packer program like *Sardine* is especially worthy for a portable computer where memory is at a premium.

This utility works by removing spaces where legal, eliminating the second through last REM comments, and combining lines where permitted by program logic. Once set into motion, it does all these things automatically.

There are two ways to use *Sardine*. One reads an in-memory file and creates a new in-memory version. The other reads the in-memory file and sends the new version to cassette. Available memory determines which you should use, and I'll cover this later.

Let's learn how to make *Sardine* work. Start by typing the listing for *Sardine* and saving it on cassette tape as a file named SARD.BA. Save it in memory under the same name.

We will first convert one in-memory file to another in-memory packed version.

The program to be compressed should be saved on tape. Load it in command mode, then type SAVE "OLD.D0" and press ENTER. This makes a double change. It turns the BASIC listing into a text file and renames it as OLD.

Now type RUN "SARD" and press ENTER. A prompt asks 1) Tape or 2) Text file?. Press 2 and the ENTER key.

*Sardine* is now doing its job. A series of O's appears on the screen, followed by a series of X's. When the O and X lines are equal, these messages appear: *Sardine* has done its work and See file PACK for program. A screen message says whether the new version is on tape or in the system.

Now type RUN "PACK" and press ENTER. After the flashing WAIT message goes off, press the SHIFT and BREAK/PAUSE keys simultaneously to stop the run. Type KIL L "PACK.D0" and press ENTER. Then type SAVE "FILE.BA" (with FILE standing for the name you want the program to have) and press ENTER.

The new packed version now exists as an in-memory BASIC file which can be run, edited and saved to tape. The file OLD.D0 has been automatically killed and you have wiped out PACK.D0.

Sending a new packed version to cassette requires slightly different steps.

When SARD.BA and OLD.D0 are safely in the computer, put a fresh tape in the tape recorder, position it past the leader, note the counter number, and depress the PLAY-RECORD buttons together.

Run SARD.BA and answer the beginning prompt with a 1, so it will pack the file onto the tape. When the program has run, rewind the tape to the start of the new file and press the PLAY button on the recorder. Press F8 to go to menu mode. Put the cursor over the word TEXT and press ENTER.

*Richard Ramella is a former newspaper editor who now works as a writer for a California hospital. He has published more than 200 computer programs.*

Type PACK and press ENTER. Press F2. Answer the Load from: prompt by typing PACK and pressing ENTER. When the material has loaded into the text file, press F8 to go to menu mode, then press ENTER to go to command mode. Type RUN "PACK" and press ENTER. As before, break into the run, type KILL "PACK.D0" and ENTER, then save the program as a BASIC listing, naming it at this point.

These two methods of using *Sardine* are given for the sake of efficiency, ease and avoiding memory mistakes.

In general, a file-to-file conversion requires the system have free bytes equal to about 85 percent of the bytes used to store the text file of the program to be converted, because a new slightly smaller file is created within the computer. In the file-to-cassette method, the in-memory file can use all but about 1,800 bytes of memory.

The following table conservatively estimates the largest number of bytes a conversion program may occupy in computers with different memories:

| System | To<br>Cassette<br>File | To<br>Text<br>File |
|--------|------------------------|--------------------|
| 8K     | 2,594                  | 1,297              |
| 16K    | 10,786                 | 5,393              |
| 24K    | 18,978                 | 9,489              |
| 32K    | 21,270                 | 13,585             |

Exceeding these limits may produce an OM (out of memory) error message.

If you run *Sardine* and get an OS (out of string) error message, the program has failed to handle the large amount of string material generated in converting a very long program. To try again, increase the CLEAR 1600 in Line 110 to a higher number. This error is improbable, but since there's a scintilla of possibility, you should know the cure.

Do not edit a program to be shortened while it is in text file form.

If you wish REM to be retained, use the symbol apostrophe ('') rather than REM.

The program will give incorrect results if you use the capital letters REM in a string. It will cut off all following material in that line.

Do not use open-ended quotes in the program to be shortened. If you do, material on the next line may be added as part of the quote, with incorrect results.

I've tested *Sardine* on numerous programs with good results. The test programs included Tandy software, listings from magazines and my own work. However, I can't give an ironclad guarantee *Sardine* will work universally. There are so many programming techniques and possible anomalies, it seems quite possible that somewhere there is a program that will stymie *Sardine*. In fact, I have found one — *Sardine* itself. It cannot be used to pack a version of itself, because the characters REM exist within quotes.

If anyone discovers other situations which thwart *Sardine*, a letter would be appreciated. Write to 1493 Mountain View Avenue, Chico, CA 95926. If you need a response, please include an SASE. □

**PCM**

**BAR CODED LISTING**

The listing:

```

100 'Sardine/Model 100/Richard Ramella
110 CLS:MAXFILES=2:CLEAR1600:DEFSTRA-K:A
B="GOTO":AC="THEN":AD="ELSE":AE="GOSU":A
Z="RESU":D="OLD"
120 PRINT"1) Tape or 2) Text file?":INPU
T"Type 1 or 2, press enter";Q:IFQ<10RQ>2
THENCLS:PRINTQ"illegal choice.":GOTO120
LSEIFQ=1THENEE="CAS:PACK"ELSEEE="PACK"
130 OPENEFOROUTPUTAS2:CLS:PRINT"Sardine
working. Patience.":PRINT:OPENDFORINPUT
AS1
140 IFEEOF(1)THEN210ELSELINEINPUT#1,E:PRI
NT"0";:FORZ=1TOLEN(E):AA=MID$(E,Z,4):IFA
A=ABORAA=ACORAA=ADORAA=AZORAA=AETHENM=4:
GOSUB160
150 NEXTZ:GOTO140
160 FORW=Z+M TOZ+M+7:IFLEN(K(S))>146THEN
S=S+1
170 H=MID$(E,W,1):IFH<>""THENR=ASC(H)
180 IFR>47ANDR<58THENG=G+H
190 IFH=",""THENG=G+"":Z=W:M=1:GOTO160
200 NEXTW:IFINSTR(K(S),G)>0THENG="":RETU
RNELSEK(S)=K(S)+" "+G:G="":RETURN
210 CLOSE1:PRINT:OPENDFORINPUTAS1
220 E="":IFEEOF(1)THENPRINT#2,B:GOTO340
230 LINEINPUT#1,E:PRINT"X":O=0+1:Y=INST
R(E,"REM"):YY=INSTR(E,"''):IFO<2THEN240

```

```

LSEIFY>0THENE=LEFT$(E,Y+2)ELSEIFY>0ANDY
Y<8THENE=LEFT$(E,YY)
240 IFINSTR(E,"DATA")>0ORY>0ORYY>0ANDYY<
8THENPRINT#2,B:B=""":PRINT #2,E:GOTO220
250 FORZ=1TOLEN(E):C=MID$(E,Z,1):IFC=CHR
$(34)THENL=L+1ELSEIFL=2THENL=0
260 IFL=1THENF=F+C:GOTO290ELSEIFC<>CHR$(
32)THEN280ELSEIFZ<4ORZ=LEN(E)THEN270ELSE
P=ASC(MID$(E,Z-1,1)):V=ASC(MID$(E,Z+1,1))
:IFP>47ANDP<58THEN280
270 IFMID$(E,Z+1,2)="TO"ORMID$(E,Z+1,4)=
"STEP"ORMID$(E,Z+1,4)=ADTHENF=F+C:GOTO29
0
280 IFC<>CHR$(32)THENF=F+C
290 NEXTZ:FORV=1TO6:P=ASC(MID$(F,V,1)):I
FP<48ORP>57THEN300ELSENEXT
300 Q$=LEFT$(F,V-1):I=" "+Q$ :FORT=0TOS:I
FK(T)=""THEN310ELSEIFB<>""ANDINSTR(K(T),
Q$)>0THENPRINT#2,B:B=""":GOTO310ELSENEXTT
310 IFB=""THENB=F:GOTO330
320 J=RIGHT$(F,LEN(F)-(V-1)):IFLEN(B)+LE
N(J)<252THENB=B+" "+JELSEPRINT#2,B:B=F:G
OTO220
330 IFINSTR(B,"RETURN")>0ORINSTR(B,"END")
>0ORINSTR(B,AB)>0ORINSTR(B,AC)>0THENPRI
NT#2,B:B=""":GOTO220ELSE220
340 KILL"OLD.D0":CLOSE:PRINT:PRINT"See f
ile PACK for program.":IFQ=1THENPRINT"It
's on tape."ELSEPRINT"It's in the comput
er."
350 FORV=1TO10:BEEP:NEXTV:END

```

PCM



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|   |           |           |
|---|-----------|-----------|
| 26-3901 Tandy 600 Port Comp 32K 3 1/2 DD    | \$1599.00 | \$1195.00 |
| 26-3904 Basic Rom for Tandy 600             | 129.95    | 110.00    |
| 26-3910 92K RAM Upgrade for Tandy 600       | 399.95    | 340.00    |
| 26-3860 Tandy 200 Port Comp 24K             | 799.00    | 650.00    |
| 26-3866 24K RAM Memory Exp Chip for 200     | 199.95    | 170.00    |
| 26-3802 Tandy 100 Port Comp 24K             | 499.00    | 425.00    |
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| 26-3808 Port 3 1/2 Disk Drive for T100 T200 | 199.95    | 169.00    |
| 26-3815 Portable Disk Case                  | 24.95     | 21.00     |
| 26-3805 Acoustic Coupler                    | 39.95     | 34.00     |
| 26-1409 Printer Cable                       | 14.95     | 12.70     |
| 26-1410 Modem Cable                         | 19.95     | 17.00     |

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|  |           |          |
|--|-----------|----------|
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| 26-1635 Profile 4 Model 4              | 249.95    | 200.00   |
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| 26-6022 Model 6000 512K 1 FD 15 Meg HD           | 5499.00   | 3795.00   |
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| 26-1274 DMP-2100P 24 Dot Matrix Printer     | 1495.00 | 1195.00   |
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| 26-1269 PT-64 Printer Controller            | 249.95  | 210.00    |
| 26-1498 SW-302 Printer Switch               | 119.95  | 100.00    |
| 26-1447 Bi-Directional Tractor for DWP 510  | 219.95  | 186.95    |

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| 25-3001 Tandy 1200 Two FD 256K          | 1499.00   | 1200.00   |
| 25-3010 VM-3 Green Monitor              | 219.95    | 185.00    |
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*DeskMate's help screens are nice, but they don't often go far enough. This month, Bobby shows you how to get more out of them*

## More Help!

By Bobby Ballard

If you've taken a look at the help files included with *DeskMate*, you've probably noticed the lack of in-depth help they provide. I'm going to show you how to make more of the help files in *DeskMate* by creating and editing your own files. In addition, you will be able to use the following information to add to the help files as we cover some of the more obscure aspects of *DeskMate* each month in the Integrated Desk. As you learn more about *DeskMate*, just use the following techniques to insert your notes right into your help files for easy future reference.

While we are going through the process of creating and editing your own help files, I will explain the use of EDLIN; the MS-DOS line editor found on your master MS-DOS diskette. So, if you haven't taken the opportunity to learn EDLIN techniques yet, this is it. Unless you bought the MS-DOS reference manual, you might have some unanswered questions concerning EDLIN and how to use it to the fullest.

On first glance, I thought that I would be able to edit the help files using the Text section of *DeskMate* and editing the help files would be one very simple process. I found this to be impossible

*Bobby Ballard is a free-lance writer and the owner of a computer software and consulting firm. He also operates a BBS in Brooklyn. Bobby can be contacted at 1207 Eighth Avenue, Apt. 4R, Brooklyn, NY 11215.*

because of the way the Text section saves its data. *DeskMate*'s Text section uses a non-standard format for storing its data that makes it incompatible with the way *DeskMate* reads its help files from the diskette. While the Text section can read MS-DOS text files, it saves them with a different format that changes the carriage returns and line feeds.

The process of creating your own personalized help files is still very simple using the EDLIN editor of MS-DOS. First, let me point out that you should use a backup copy of *DeskMate* for this exercise. If you run into any problems you won't destroy valuable files and information on your original or working copies. After you are finished editing, you may copy your new help files to your working copy and delete the old help files. You might even want to create and keep a separate disk or directory for your original and modified help files for future use.

### The Basics

If you've been using *DeskMate* for any length of time, you probably know that the Text section can't recognize a text file unless the filename ends with .DOC as the extension. The same is true for the way *DeskMate* recognizes help files. Their filenames must end with .HLP as the extension. If you rename any of the *DeskMate* help files with the extension .DOC, they will show up in the Text section menu and you may read or

print these files as any other text file. However, if you save any of these files back to diskette and rename them again using the .HLP extension, *DeskMate* will not be able to read the help file properly. The edited help files will write only to the top line of the screen, overwriting each previous line.

If you do a DIR command from MS-DOS on your *DeskMate* diskette, you will notice that there are nine help files that match the nine main sections of *DeskMate*. Look at Table 1 for a list of the help files and the corresponding section of *DeskMate* related to each file. Each of these files can be deleted, edited or increased.

To delete a help file while in *DeskMate*'s main menu, just press F9 and respond to the prompt at the bottom of the screen with the name of the help file you wish to delete. To edit or add information to one of the help files, read on.

#### Output Control

The method *DeskMate* uses to keep track of the help files while printing them to your screen involves the use of certain characters that pause output or signal the end of the file. While using a help file, you are given the option of pressing ENTER or F12 at the end of each screen. Note here that F12 is for the Tandy 1000 version of *DeskMate* and might be a different key on your system or version of *DeskMate*. By pressing ENTER, you continue to the next screen of information, providing there is one. Pressing F12 will take you back to the section you were in previous to invoking the help file.

When *DeskMate* finds a vertical line character (|), it pauses output and waits for a keystroke (either ENTER or F12). A backslash (\) tells *DeskMate* that it has reached the end of the help file and either ENTER or F12 will take you back to the section from which you called the help file. Anytime *DeskMate* finds either of these two characters in a line in a help file causes the above actions to be taken.

Now that you know how *DeskMate* controls help file output, you can create your own help files, including the number of screens, the content and the end of the file.

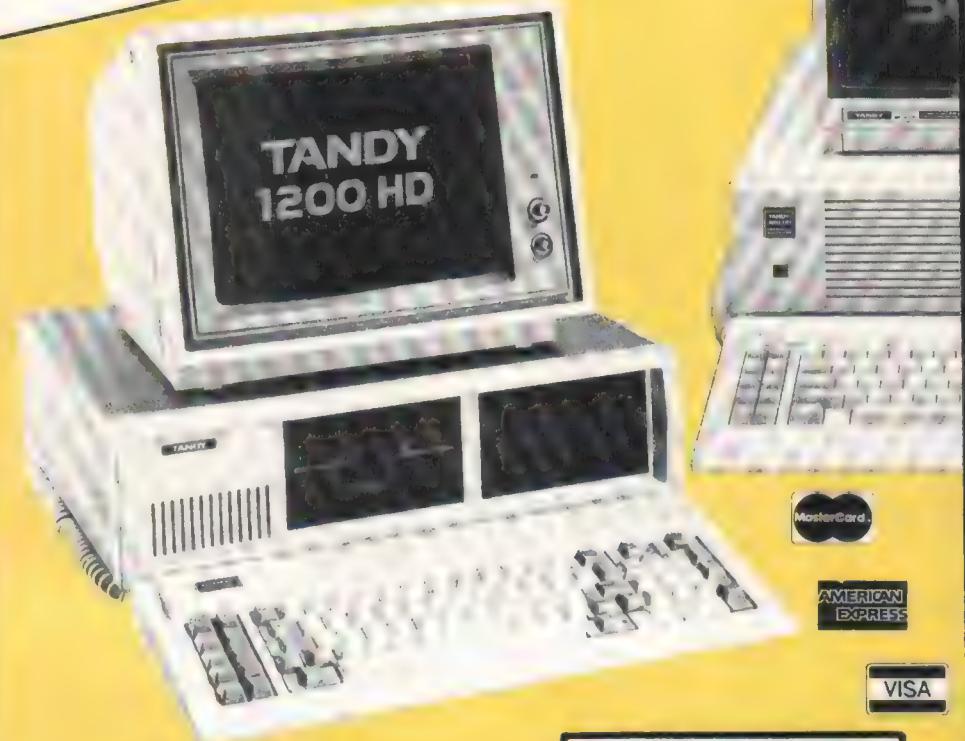
#### Editing

As I mentioned earlier, you can create or edit your help files using the line editor supplied on your MS-DOS

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diskette. However, you might be able to edit your help files using another word processor or editor that saves files in the standard MS-DOS format. If you have another word processor or editor available, try it and see if it works for you.

To test your word processor or editor, load one of the help files into the editor and re-save it under a different name. Then, from the MS-DOS command level, use the TYPE command to take a look at your saved file. If the file appears on the screen with line feeds in the correct places and you can read the data as text, your word processor or editor might just work. Some word processors have the ability to save text either in MS-DOS format or in its own specialized format.

If you think your word processor or editor might work, rename the edited file to its original name and make sure you keep the original help file under a different name in case something fails. Now start up *DeskMate*, enter the appropriate section and press ALT-1 to invoke the help file. If everything goes well, you should see your new help file on screen with pauses at each location you included a verticle line (|) and end where you placed the backslash (\) character.

## EDLIN

If you don't have an alternative way of editing MS-DOS files, you can use EDLIN to do your help file editing. To use EDLIN, just type EDLIN followed by the name of the file you wish to edit and press ENTER. For example, to edit the TWME.NU.HLP file, type EDLIN TWME.NU.HLP and press ENTER. You must make sure that the file you wish to edit is on the same diskette as EDLIN or on a diskette in another drive or on your hard disk drive.

Once the line editor and file are loaded you will see a message explaining that the end of file has been reached. Now you may begin editing the help file to include any information you desire. You might want to delete some of the help file and replace the information with more specific information. In addition, you can reformat the data so that more help is presented on one screen at a time. Most of the help files, for example, are double spaced and require that you press ENTER several times to access all of the available data.

EDLIN will be a familiar way of editing if you've ever edited a BASIC listing or used any other line oriented

Table 1

DeskMate Help Files

|                    |                   |
|--------------------|-------------------|
| TWTEXT.HLP .....   | Text Section      |
| TWWORK.HLP .....   | Worksheet Section |
| TWFILER.HLP .....  | Filer Section     |
| TWTELCOM.HLP ..... | Telecom Section   |
| TWCALEND.HLP ..... | Calendar Section  |
| TWMAIL.HLP .....   | Mail Section      |
| TWALARM.HLP .....  | Alarm Section     |
| TWHOST.HLP .....   | Host Section      |
| TWMENU.HLP .....   | Main Menu Section |

editor. EDLIN, unlike a word processor, edits only one line at a time. Therefore, each command in EDLIN must be given in relation to a particular line number.

Once you have EDLIN and your file loaded, press **L** at the asterisk prompt (\*) and press **ENTER**. You will see a listing of the first 23 lines of your file. Each line will have a line number assigned to it, yet, those numbers are not saved to diskette when you are finished editing. The numbers are for EDLIN's use only. Refer to your *MS-DOS Quick Reference Guide* or manual for a list of EDLIN commands and key functions.

Using the EDLIN commands and special key functions, you have the tools to create and edit your own help screens. It may not be as convenient as using *DeskMate*'s Text section or other word processor but it gets the job done.

Now let's take a look at one of the *DeskMate* help files and how it might be improved. Don't forget that not only can you change the text of your help files, you can also change the looks and format too. Figure 1 shows you the way *TWALARM.HLP* comes on the *DeskMate* disk and Figure 2 shows you some of the improvements you might wish to make to this same file. Figure 1 is also an example of how EDLIN would list *TWALARM.HLP* on your screen.

In Figure 1, the text is double-spaced and covers only the basics of the alarm section. In Figure 2, I've added some information that might not be as readily apparent as are the function key operations. This might or might not be the type of information you wish to keep in your help files; it's just an example of what you might do with a help file. You might also add information about the way you have your system set up or include notes about different directories. You might wish to improve the over-all look of the help screens with using asterisks, dashes, underlines and more.

#### EDLIN B:*filename.ext*

This would load the line editor and then search and load your file from Drive B.

A one-drive system would use the command:

**EDLIN *filename.ext*.**

A third point to remember concerns the way EDLIN protects the files you are editing. When you use EDLIN, it creates a new file on your diskette using the same filename but with a new extension of **.BAK**. This becomes the backup file in case something goes wrong during editing. If disaster strikes, you can always go back, rename and use the old file. EDLIN will not load a file with the extension **.BAK** as a protection against destroying your original file. You must rename the file with a new extension. EDLIN will then load it and create a new backup file.

A final point to remember is not explained in the *MS-DOS Quick Reference Guide*. The insert mode of EDLIN will continue to add lines to your file with each press of the **ENTER** key. To escape the insert mode, you must use **CTRL-C** to send the break signal. Also, pressing the **ESC** key at the end of your file will place the backslash (\) into your text automatically.

Figure 1:

```

1:*
2:          Alarm
3:
4: To select a function, press appropriate function keys.
5:
6: [F6] MERGE events from Calendar file into Alarm file.
7:
8: [F7] SELECT beginning of event block, move marker to end of
9:      desired block, then COPY or DELETE.
10:
11: [F8] COPY SELECTed events to copy buffer or to specifiedfile.
12:
13: [F9] DELETE current event or SELECTed events from Alarm file.
14:
15: [F10] ADD an event to Alarm. Events automatically sortindate/
16:      time order.
17:
18: [F12] Return to Main Menu.
19:
20: Special Note: Alarm events displayed in upper right corner of
21: Main Menu for each day. If Alarm is ON, events are automatically
22: deleted from Alarm file as their dates and times pass.
23: \

```

Figure 2:

Alarm

To select a function, press appropriate function keys.

- [F6] MERGE events from Calendar file into Alarm file.
- [F7] SELECT beginning of event block, move marker to end of desired block, then COPY or DELETE.
- [F8] COPY SELECTed events to copy buffer or to specified file.
- [F9] DELETE current event or SELECTed events from Alarm file.
- [F10] ADD an event to Alarm. Events automatically sort in date/time order.
- [F12] Return to Main Menu.

\*\* SPECIAL NOTES \*\*

You cannot turn the Alarm On while in the Alarm screen. When Alarm is ON the Main Menu has an "@" in the far upper right hand corner of the screen next to the date and time.

Alarm events displayed in upper right corner of DeskMate's Main Menu for each day. If Alarm is ON, events are automatically deleted from Alarm file as their dates and times pass.

Put Away the Manuals

Now that you know how to create and edit your own *DeskMate* help files, you might never need to pull out the manuals again. If you find yourself repeatedly searching for manuals or magazine articles that have information concerning *DeskMate*, you won't have to now. Now you can add the information to your help files and stop your searching. As we cover more and more of the details of *DeskMate* here in PCM and the Integrated Desk, you will be able to put the information into your help files and always have it at your finger tips.

If you have any problems, questions or suggestions about this or any other aspect of *DeskMate*, don't hesitate to write me a letter or contact me on Delphi in the MSDOS group.

PCM

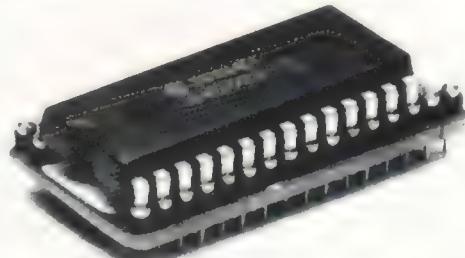
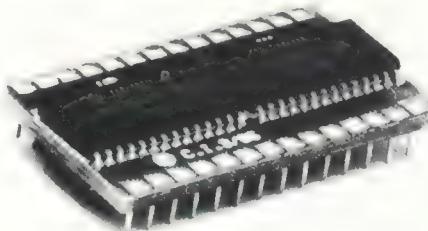
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# 'The' Gathering Place for Tandy Computer Users

By Kevin Nickols  
MS-DOS SIG Manager

**M**any of you have already joined us on Delphi in PCM's MS-DOS SIG. At the first of this year, membership in the group was already above 1,200 with more than 100 users logging on each day.

Because of the rapid influx of new subscribers we helped bring to Delphi, there have been some problems getting manuals and command cards delivered in a timely manner. In an effort to offset this inconvenience to our readers, we are reproducing a modified version of the Delphi command card on the following two pages.

I have somewhat disappointing news for our members north of the border this month who access Delphi through the Canadian Datapac network. Datapac is a packet-switched network with a very complex rate schedule, levying charges for every kilocharacter of data transferred. They have an arrangement with the U.S. carriers, Tymnet and Uninet, who bill Delphi for the Datapac usage connected through their networks. Because of high charges Delphi is incurring through this arrangement, they have decided to raise their surcharge for Datapac connection from \$3 to \$12 an hour. With Delphi's own charge for service of \$6 an hour, evenings and weekends, this brings the cost to \$18 for the users who must access through the Datapac network (U.S. dollars, that is).

However, there are some alternatives and there will be more in the future.

Tymnet has a node in Toronto and plans to add other major Canadian cities early in the year. Uninet also plans to add Canadian nodes to its network soon, with rates only slightly higher than for the U.S. Also, Bell Canada is apparently running a promotion called INET2000, offering service into Delphi at a round-the-clock rate of \$16 an hour.

I would like to take a moment to mention the names of some people who have helped, in one way or another, get the MS-DOS SIG online and off to an impressive beginning. John Smithers, Bob McDonald, Bob Herring, Bob Jack, Bobby Ballard (lot's of Bobs!) and Leonard Hyre all deserve special thanks from me personally and all the rest of the group members.

Which brings me to a point that I'll direct to all the programmers among you: Even if you don't care to join the SIG, or simply don't have the time to take part, you can still share your programs with other Tandy users who would love to have them. Send them to PCM (on a disk), along with operating instructions, and clearly state that they are for use on the MS-DOS SIG rather than a submission to the magazine. I will post them in the group's databases and place your name in the display as the owner of the program.

Send your suggestions and comments to me by Delphi Mail: Username (NICKOLS). I'll be waiting to hear from you.

# DELPHI

Typing **BYE** from any prompt (except the **MAIL** prompt) will log you off of Delphi.

Typing **[?]** [ENTER] will generally display a full menu or provide help.

## IMMEDIATE COMMANDS (Can be used at any time.)

This abbreviated, modified version of Delphi's command card has been created to help our readers who use Tandy® MS-DOS Computers get started quickly on PCM's new MSDOS SIG. It is being reproduced here for your convenience and can be removed, if you wish, and kept near your computer for easy reference.

## WELCOME TO DELPHI

Most Delphi commands are self-explanatory. This card will serve as a handy backup reference.

Signing onto Delphi Directly

1. Dial (617)-576-0862.
2. When you have carrier, press [ENTER] once or twice.
3. At "USERNAME" type your membername and [ENTER].
4. At "PASSWORD" type your password and [ENTER].

How To Sign On Using Uninet

1. Dial your local Uninet number.
2. Hit [ENTER] [.] [ENTER] at the **[x]** or **"L?"** prompt.
3. Type DELPHI or GVC at the SERVICE prompt.
4. Then type your USERNAME and PASSWORD as outlined above.

How To Sign On Using Tymnet

1. Dial your local Tymnet number.
2. When "PLEASE TYPE YOUR TERMINAL IDENTIFIER" appears, type **A**.
3. When "PLEASE LOG IN" appears, type **DELPHI**.
4. Then type your USERNAME and PASSWORD as outlined above.

How To Sign On Using Datapac (Canada)

1. Dial your local Datapac number.
2. Type **[.]** for 300 baud or **[.] [.]** for 1200 baud.
3. Type Set 2:1, 3:126 for full duplex allowing deletes.
4. Type p 1 3106, DELPHI; [ENTER] (Tymnet)
5. Then type your USERNAME and PASSWORD as outlined above.

To obtain your local access number you may call Tymnet at 800-336-0149 or Uninet at 800-821-5340. If you have problems at any time, call Delphi toll-free at 1-800-544-4005. (Mass. 617-491-3393)

Note: Most commands require only enough letters to be entered to make them unique. For example, to enter CONFERENCE from the Main Menu, simply type "C" and [ENTER]. Do not press [ENTER] after commands using the Control Keys. Most other commands require pressing [ENTER] to activate them.

From the MSDOS SIG> prompt type DA, and pick a topic, then type WO to reach Workspace.

**APPEND** – append one file to another.

**CATALOG** – shows which files you have created.

**COMMON** – go to the Delphi Common work area.

**CREATE** – creates file and stores it in your area.

**DELETE** – deletes files you no longer need.

**DOWNLOAD** – download a file from Delphi to your disk.

**EDIT** – create and edit your own text files.

**EXIT** – return to Main Menu.

**HELP** – explanation of WORKSPACE commands.

**HOME** – return home to your private work area.

**LIST** – lists contents of any file in your catalog.

**PUBLISH** – submits your file for Delphi publication in Authors, Members Choice or Newsletters.

**PURGE** – delete all but current version of duplicate files.

**UPLOAD** – upload a file from your computer to Delphi.

**XDOWNLOAD** – download via XMODEM protocol.

**XUPLOAD** – upload via XMODEM protocol.

## MSDOS SIG FORUM

**ADD** – start a new message thread with a different topic.

**BACK** – moves backwards within a thread.

**DELETE** – delete a message.

**DIRECTORY** – display a directory of messages.

**EDIT** – edit the current message.

**EXIT** – exit forum.

**FILE** – put a copy of a message in your workspace.

**FOLLOW** – follow a message thread. Read only the messages of a particular thread.

**FORWARD** – send a copy of a message by mail.

**HELP** – get help on forum actions and commands.

**HIGH** – set, show the high message number.

**MAIL** – take you directly to mail.

**NEXT** – read next message. ([ENTER] defaults to NEXT.)

**READ** – read a message. (Typing message number will read that message.)

**REPLY** – reply to a message.

**TOPICS** – set/show message topic.

## CONFERENCE

**ADD** – return to Main Menu.

**JOIN** (groupname) – join existing group or start new one.

**NAME** (newname) – change your name or "handle".

**PAGE** (username) – pages another user in the system.

**SCHEDULE** – transfer you to the Conference Schedule.

**WHO** – lists all current users and Conference groups.

Conference Immediate Commands (use while in Conf).

**ACCEPT** – accept another's page from within current group.

**ANSWER** – respond to or decline PAGE from another user.

**CANCEL** – terminate a PAGE to another user.

**EXIT** – like CONTROL-Z; gets you out of wherever you are.

**GAG** – disable /SEND's from people outside your conference group.\*

## WORKSPACE

Workspace is an area for you to store files and messages of all types.

This is where you must first upload a file before submitting it to a database. You can file forum messages for retrieval later. Mail messages can be stored here.

## DELPHI TERMINAL CONFIGURATION GUIDE

**REPLY** — sends a reply to sender of current message.  
**SEARCH** (string) — searches current Mail file for specified character string.

**SELECT** — pick messages for delete operation.  
**SEND** — sends message to another user or users.  
**SEND** (filename) — sends file (filename) to other user(s).

**SEND/EDIT** — calls editor to edit message being sent.  
**SEND/LAST** — uses last message as text for current message.

**NAME** — create a conference nickname (handle).  
**PAGE** — ask another user to join your group.  
**PASS** (password) — say the password for admittance into password groups.

**REJECT** — a pleasant "No thank you" to whomever is paging.  
**REPEAT** — turns Echo on or off.\*  
**RNAME** (nickname) — show the username of a person using a handle.  
**SCHEDULE** — transfer you to the Conference Schedule.

**SEND** (username) — send message to current user.  
**/SQUELCH** (username) — ignore messages from a user.\*  
**TALK** — like /JOIN, but doesn't leave current group. /\* also works, where # is the number of a conference group. Allows you to participate in more than one group at the same time.

**/WHO** — lists all current users and Conference groups.  
**/WHOIS** (username) — displays (username) Profile.

\*Note: Many of these commands may be preceded by NO. For example, /GAG disables sends, but /NOGAG resumes them.

### DELPHI MAIL

Primary Mail Menu (DMAIL)

**CATALOG** — lists all Mail files you have created.  
**EXIT** — return to Main Menu.  
**HELP** — explanation of Mail commands.  
**MAIL** — send or read mail. Enters Secondary Mail Menu.  
**SCAN** — display the headers for all unread mail.

Secondary Mail Menu (MAIL)

[ENTER] — depressing the return or carriage return key, will read the next message or more of the current message.  
**DELETE** — deletes current (last read) message.  
**DIRECTORY / Folder** — lists summary of messages in the specified folder. For instance, DIR Pending.  
**EXIT** — returns to Main Menu.  
**EXTRACT** (filename) — adds current message to the named folder.  
**FILE** (folder name) — adds current message to the named folder.  
**FORWARD** — forward present message to others.  
**NEXT** — skips to next Mail message. ([ENTER] defaults to NEXT.)  
**READ** — displays your Mail messages.  
**READ (folder name)** — reads contents of named Mail folder.  
**READ (n)** — allows you to read selected message number.  
**READ / NEW** — for new MAIL arriving while in MAIL.

**REPLY** — sends a reply to sender of current message.  
**SEARCH** (string) — searches current Mail file for specified character string.

**SELECT** — pick messages for delete operation.  
**SEND** — sends message to another user or users.  
**SEND** (filename) — sends file (filename) to other user(s).

**SEND/EDIT** — calls editor to edit message being sent.  
**SEND/LAST** — uses last message as text for current message.

**NAME** — create a conference nickname (handle).  
**PAGE** — ask another user to join your group.  
**PASS** (password) — say the password for admittance into password groups.

\*sometimes you have to experiment with other combinations such as: (7 bit, 1 stop, no parity) or (8 bit, 1 stop, even or odd parity).

### NOTES

To erase a character, Delphi uses the ASCII delete/rubout key which is decimal 127. If necessary, the terminal program should translate the backspace key to a delete/rubout. Unfortunately the networks do not echo the delete/rubout correctly however it will have the desired effect.

Delphi uses the following control characters:

**CONTROL-Z** — end of input or exit to next higher menu.  
**CONTROL-S** — suspends sending.  
**CONTROL-Q** — resumes sending.  
**CONTROL-O** — skips to end of file or message.  
**CONTROL-U** — cancels input for current line.  
**CONTROL-R** — redisplay current line.  
**CONTROL-X** — cancels everything typed ahead but unsent.  
**CONTROL-C** — cancel current activity and start over.

If a particular control key is causing the terminal program to take some other action, then the terminal program should be reconfigured to use any of the other available control keys in place of the one required by Delphi.

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**SETUP** — terminal and network configuration.  
**LENGTH** — lets you find your screen length and tailor Delphi accordingly.  
**MENU** — choose default menu at sign-on.  
**PASSWORD** — change your password. (frequent changes are recommended.)  
**PROMPT** — select level of menu prompting desired.  
**SET-TYNET** — experiment with setting network parameters.  
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# Household Inventory

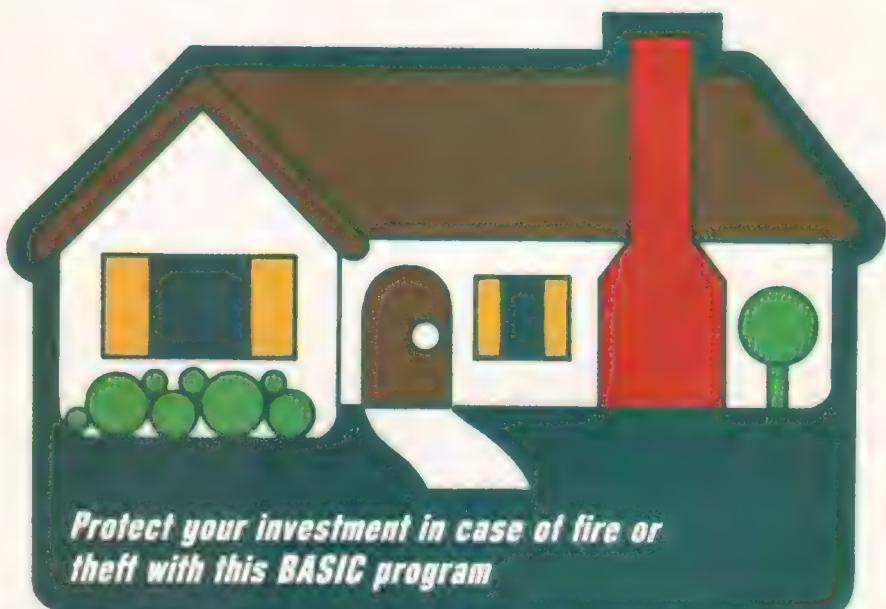
By Elsner H. Baade

A recent boating accident resulted in the loss of considerable and expensive equipment. Fortunately, on the advice of my insurance agent, I had made an inventory of this equipment, put it into the computer and provided him with a copy for placement with my insurance file. In response to my claim, the adjuster simply verified the actual items lost and the settlement was quickly and fairly made.

The *Household Inventory* program is a simple program written in Tandy 1200 BASIC and should work on any of Tandy's MS-DOS computers. It provides an easy way to keep a complete, room-by-room inventory showing the description, date of purchase and cost or value of each item. The printer control codes used are for the DMP-2100 printer but may easily be adjusted to accommodate other printers.

*Household Inventory* is an easy-to-use, menu-driven program with simple user responses throughout. The program loads in BASIC under the abbreviated name of **HOUSE**. When first run, the program presents a short title screen followed by the main menu which offers four options: 1) Initialize File, 2) Add to Data File, 3) Correct Data File and 4) Print Data.

Begin by selecting Option 1, Initialize File and press **ENTER**. This is followed by the question, "do you want to initialize the ownership file?". Actually, as indicated in the listing, lines 30 through 160, there are two random access files in the program. The first is the ownership file which stores the name of the



*Protect your investment in case of fire or theft with this **BASIC** program*

person who owns the property and the address. The other file stores the household inventory. Since you are just starting, respond with **Y**. The program allows for either upper- or lowercase responses. Now, simply enter your responses to the questions. After entering the state, you will have the option of correcting the full entry by entering it again. A **Y** response will close the file and continue the program.

Answer **Y** to the question, "do you want to initialize the household furnishings?". At this point, it is simply a matter of responding to the questions. After the fourth response, you are again given the opportunity to correct your entry by entering it again or continuing to the next item by responding with **Y** or **N**. Please note that the date purchased must be filled. If in doubt as to when an item was purchased, simply fill in the month and day with zeros and guess the year as closely as possible. For example: **00/00/62**.

It is not necessary that household items be entered in any orderly fashion. That is, you may enter an item located in the garage, the next located in the third bedroom and the next located in the living room. The program will sort these and print them under the proper location heading. In practice, however, it is best, when initializing the file, to list all the items in a given room. Then move to the next room.

You may end entries to the file and close it by responding **N** to the question,

"do you have more entries?". Or, if you desire to quit the program at this point press **CTRL-BREAK** together. The files are automatically saved when they are closed but, if you haven't saved the **BASIC HOUSE** program after typing it in, do it now.

Assuming you are again back at the main menu, you now have the other options. If you have completed the inventory input, you will probably want to print it by selecting Option 4, Print Data. The program cautions you to check the printer and press **ENTER** when ready to print. I use standard 9½ by 11 continuous, blank paper.

The printout will show you the record number of each item. Thus, if you want to correct any item, you can easily and quickly do so. Select Option 3, "Correct Data File" and in response to the question, "what record number do you want to correct?" enter the appropriate record number. There are several responses built into the program. The first is to ask if you want to delete the data. If the answer is **Y** the question is "are you sure?". A **Y** answer causes all the data in the record to be deleted and you are advised of that fact on the screen. If you have more corrections, the program continues. If you enter a record number which has previously been deleted, the program will respond and continue. An entry of a record number which is greater than the end-of-file will also be noted. An **N** response to the correction question will take you back

---

Elsner Baade is retired and is a self-taught programmer. He currently maintains and runs mailing lists for several local service organizations and has developed the computer programs for the local Meals On Wheels office.

to the main menu.

Adding to the data file is accomplished by selecting Option 2, "Add To Data File." When Option 2 is selected, the program follows the same routines as used to initialize the file except the additional data records are added consecutively to the previous highest record number.

Essentially, that's how the program

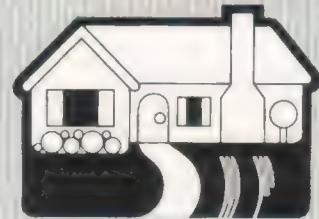
works. You should find that the locations given are adequate for the average three-bedroom house. If you need more or less, it's a simple matter to change, add or delete. Location information is programmed in lines 620 to 730, lines 1100 to 1220, lines 1790 to 1910 and lines 2030 to 2140. Any changes, additions or deletions should be made in each of these areas. I particularly draw

your attention to Line 1790. The number used in this DIM D1\$( ) must be equal to the highest D1\$( ). Also, in Line 1930, the M figure must be changed correspondingly.

In developing the program, I arbitrarily established 500 as the number of records in the file. Refer to Line 1930 (N = 500). If you find you need more, just increase this accordingly. □

### The listing:

```
10 ! ***** Household Inventory Program *****  
20 !  
30 ! Variables Used - Owners File  
40 ! "OWNER" - Random Access File (90)  
50 ! NF$ = Person(s) Name (30)  
60 ! AF$ = Address of Property (30)  
70 ! CYFS = City (15)  
80 ! RS = User Response  
90 !  
100 ! Variables Used - Property inventory  
110 ! "POSSN" - Random Access File (50)  
120 ! AF$ = Description of Property (30)  
130 ! BF$ = Location of Property (2)  
140 ! CFS = Date of Purchase (8)  
150 ! DF$ = Cost or Value (10)  
160 ! RS = User Response  
170 !  
180 !  
190 GOSUB 2300  
200 CLS  
210 COLOR 15,1,14 : CLS  
220 LOCATE 3,40: PRINT "Menu"  
230 LOCATE 5,30: PRINT "1 - To Initialize File"  
240 LOCATE ,30: PRINT "2 - To Add To Data File"  
250 LOCATE ,30: PRINT "3 - To Correct Data File"  
260 LOCATE ,30: PRINT "4 - To Print Data"  
270 LOCATE 10,30: BEEP: INPUT "Enter Number of Selection ",SELECTION  
280 ON SELECTION GOTO 290,1230,1270,1640  
290 CLS : LOCATE 5,10: PRINT "You have chosen to initialize the file ": LOCATE 7  
,10: PRINT "Do you wish to initialize the ownership file ? ": LOCATE ,10: INPUT  
"(Y or N) ",RS  
300 IF LEFT$(RS,1) = "N" OR LEFT$(RS,1) = "n" THEN GOTO 520  
310 IF LEFT$(RS,1) = "Y" OR LEFT$(RS,1) = "y" THEN GOTO 320 ELSE BEEP: BEEP: GOT  
0 290  
320 CLS: GOSUB 2270  
330 R = 1  
340 LOCATE 3,10: BEEP: INPUT "Enter person(s) owning the property ",NS  
350 CLS: LOCATE 3,10: BEEP: INPUT "Enter street address where property is located  
d ",AS  
360 CLS: LOCATE 3,10: BEEP: INPUT "Enter City where property is located ",CYS  
370 CLS: LOCATE 3,10: BEEP: INPUT "Enter State where property is located ",SS  
380 CLS: LOCATE 5,20: PRINT NS  
390 LOCATE ,20: PRINT AS  
400 LOCATE ,20: PRINT CYS  
410 LOCATE ,20: PRINT SS  
420 LOCATE 10,20: BEEP: INPUT "Is this correct ? ",RS  
430 IF RS = "N" OR RS = "n" THEN GOTO 340
```



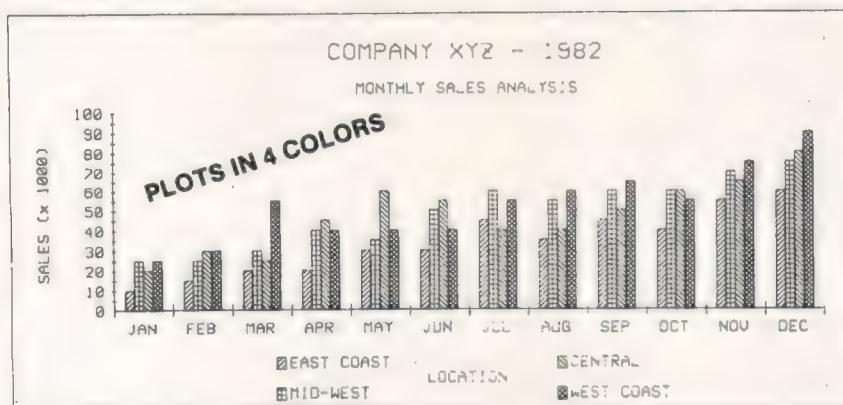
```

440 LSET NFS = NS
450 LSET AF$ = AS
460 LSET CYFS = CY$ 
470 LSET SF$ = SS
480 PUT #1,R : CLOSE #1 : CLS: LOCATE 10,20: PRINT "File closed"
490 LOCATE 12,20: BEEP: PRINT "Do you want to initialize the household furnishin
gs ?"
500 LOCATE ,20: INPUT "(Y or N ) ",R$ 
510 IF LEFT$(R$,1) = "N" OR LEFT$(R$,1) = "n" THEN CLS: GOTO 220
520 CLS: LOCATE 5,10: PRINT "You have selected to initialize the inventory file"
530 GOSUB 1060
540 R = 0
550 R = R + 1
560 LOCATE 7,10: BEEP: INPUT "Enter Description of Item ",I$ 
570 IF I$ = "" THEN BEEP: GOTO 560
580 IF LEN(I$) > 30 THEN BEEP: BEEP: LOCATE 9,10: PRINT "Too Long - 30 Maximum":
GOTO 560
590 IF LEN(I$) < 30 THEN I$ = I$ + " ": GOTO 590
600 CLS
610 LOCATE 3,10: PRINT "What is the location of Item ?"
620 LOCATE 5,14: PRINT "1 = Garage"
630 LOCATE ,14: PRINT "2 = Kitchen"
640 LOCATE ,14: PRINT "3 = Dinnette Area"
650 LOCATE ,14: PRINT "4 = Dining Room"
660 LOCATE ,14: PRINT "5 = Family Room"
670 LOCATE ,14: PRINT "6 = Living Room"
680 LOCATE ,14: PRINT "7 = Master BR/Bath"
690 LOCATE ,14: PRINT "8 = # 2 BR/Bath"

```

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```

790 LOCATE ,14: PRINT "9 = # 3 BR/Bath"
710 LOCATE ,14: PRINT "10 = Basement"
720 LOCATE ,14: PRINT "11 = Patio"
730 LOCATE ,14: PRINT "12 = Yard"
740 PRINT: LOCATE ,10: INPUT "Select number and <ENTER> ",L$ 
750 IF L$ = "" THEN 740
760 IF LEN(L$) > 2 THEN BEEP : BEEP: LOCATE 18,10: PRINT "Too long - max 2 - re-
enter": GOTO 610
770 IF LEN(L$) < 2 THEN L$ = L$ + " ": GOTO 770
780 CLS
790 LOCATE 5,10: INPUT "Enter Date Purchased (mm/dd/yy) ",D$ 
800 IF D$ = "" THEN 790
810 IF LEN(D$) < 8 THEN BEEP: CLS: LOCATE 3,10: PRINT "Re-enter": GOTO 790
820 CLS
830 LOCATE 5,10: INPUT "Enter cost of item (dollars & cents) ",C$ 
840 IF C$ = "" THEN 830
850 IF LEN(C$) > 10 THEN BEEP: CLS : LOCATE 3,10: PRINT "Re-enter": GOTO 830
860 IF LEN(C$) < 10 THEN C$ = C$ + " ": GOTO 860
870 CLS
880 LOCATE 5,10: PRINT I$ 
890 GOSUB 1090
900 LOCATE ,10: PRINT D$ 
910 LOCATE ,10: PRINT C$ 
920 LOCATE 10,10: INPUT "Is this correct? ",R$ 
930 IF LEFT$(R$,1) = "N" OR LEFT$(R$,1) = "n" THEN CLS: GOTO 560
940 LSET AF$ = I$ 
950 LSET BF$ = L$ 
960 LSET CF$ = D$ 
970 LSET DF$ = C$ 
980 PUT #1,R 
990 CLS
1000 LOCATE 5,10: INPUT "Do you have more entries? ",R$ 
1010 IF LEFT$(R$,1) = "N" OR LEFT$(R$,1) = "n" THEN GOTO 1040
1020 CLS
1030 GOTO 550
1040 CLOSE #1: CLS: LOCATE 5,10: PRINT "File closed"
1050 LOCATE 7,10: INPUT "Press <ENTER> to return to menu ",R$ : CLS: GOTO 220
1060 OPEN "R",#1,"POSSN",50
1070 FIELD #1,30 AS AF$,2 AS BF$,8 AS CF$,10 AS DF$ 
1080 RETURN
1090 X = VAL(L$)
1100 IF X = 1 THEN LOCATE 6,10: PRINT "Garage": RETURN
1110 IF X = 2 THEN LOCATE ,10: PRINT "Kitchen": RETURN
1120 IF X = 3 THEN LOCATE ,10: PRINT "Dinnette Area": RETURN
1130 IF X = 4 THEN LOCATE ,10: PRINT "Dining Room": RETURN
1140 IF X = 5 THEN LOCATE ,10: PRINT "Family Room": RETURN
1150 IF X = 6 THEN LOCATE ,10: PRINT "Living Room": RETURN
1160 IF X = 7 THEN LOCATE ,10: PRINT "Master BR/Bath": RETURN
1170 IF X = 8 THEN LOCATE ,10: PRINT "# 2 BR/Bath": RETURN
1180 IF X = 9 THEN LOCATE ,10: PRINT "# 3 BR/Bath": RETURN
1190 IF X = 9 THEN LOCATE ,10: PRINT "# 3 BR/Bath": RETURN
1200 IF X = 10 THEN LOCATE ,10: PRINT "Basement": RETURN
1210 IF X = 11 THEN LOCATE ,10: PRINT "Patio": RETURN
1220 IF X = 12 THEN LOCATE ,10: PRINT "Yard": RETURN
1230 CLS: GOSUB 1060
1240 R = (LOF(1)/50) + 1
1250 GET #1,R
1260 GOTO 560
1270 GOSUB 1060

```

```

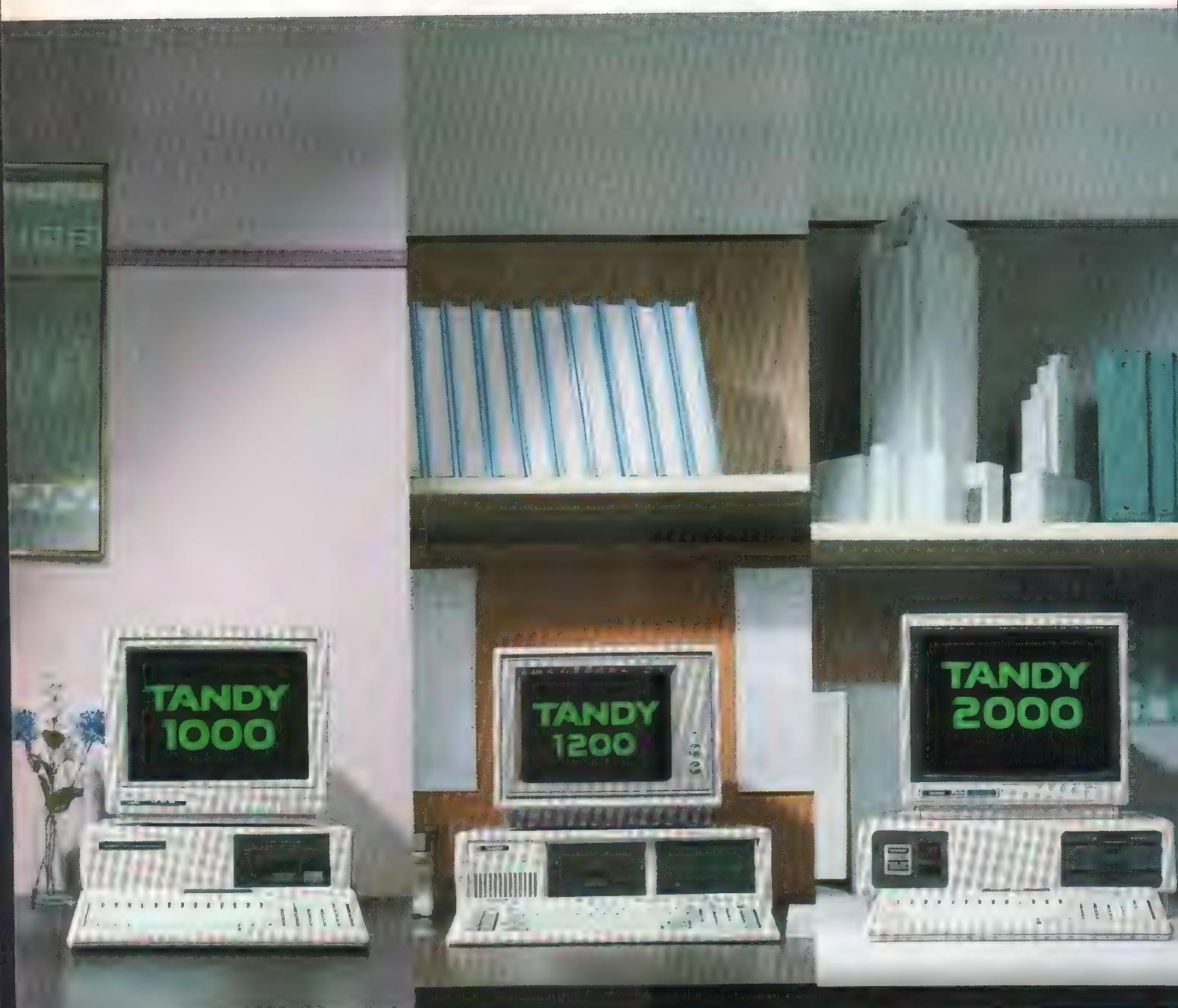
1280 CLS: LOCATE 10,10: INPUT "What record number do you want to correct? ",R
1290 GET #1,R:CLS
1300 IF R > (LOF(1)/50) THEN LOCATE 12,10: PRINT "Record number greater than end
of file ": FOR T = 1 TO 1500: NEXT T : LOCATE 12,10: COLOR ,1: PRINT STRING$(40
,CHR$(32)): COLOR 15 : GOTO 1280
1310 LOCATE 5,10: PRINT AF$
1320 LOCATE ,10: PRINT BF$
1330 LOCATE ,10: PRINT CF$
1340 LOCATE ,10: PRINT DF$
1350 IF AF$ = STRING$(30,CHR$(32)) THEN LOCATE 5,10: PRINT "The data for record
number ";R;"has been deleted ",X$ : FOR T = 1 TO 1500: NEXT T : GOTO 1500
1360 LOCATE 10,10: INPUT "Do you wish to delete this data? ",R$: IF LEFT$(R$,1)
= "Y" OR LEFT$(R$,1) = "y" THEN LOCATE 12,10: INPUT "Are you sure ? ",R$
1370 IF LEFT$(R$,1) = "Y" OR LEFT$(R$,1) = "y" THEN CLS: GOTO 1540
1380 LOCATE 10,10: COLOR 1: PRINT STRING$(60,CHR$(32)): COLOR 15
1390 LOCATE 11,10: INPUT "Enter correct description ",I$
1400 LOCATE 12,10: INPUT "Enter correct location ",L$
1410 LOCATE 13,10: INPUT "Enter correct date of purchase ",D$
1420 LOCATE 14,10: INPUT "Enter correct cost ",C$
1430 LOCATE 16,10: INPUT "Are these now correct ? ",R$
1440 IF LEFT$(R$,1) = "N" OR LEFT$(R$,1) = "n" THEN CLS : GOTO 1310
1450 LSET AF$ = I$
1460 LSET BF$ = L$
1470 LSET CF$ = D$
1480 LSET DF$ = C$
1490 PUT #1,R
1500 CLS: LOCATE 9,10: INPUT "Do you have more corrections? ",R$
1510 IF LEFT$(R$,1) = "N" OR LEFT$(R$,1) = "n" THEN CLOSE #1: CLS: GOTO 220
1520 IF LEFT$(R$,1) = "Y" OR LEFT$(R$,1) = "y" THEN GOTO 1530 ELSE GOTO 1500
1530 GOTO 1280
1540 I$ = STRING$(30,CHR$(32))
1550 L$ = STRING$(2,CHR$(32))
1560 D$ = STRING$(8,CHR$(32))
1570 C$ = STRING$(10,CHR$(32))
1580 LSET AF$ = I$
1590 LSET BF$ = L$
1600 LSET CF$ = D$
1610 LSET DF$ = C$
1620 PUT #1,R : CLS: LOCATE 10,10: PRINT "Record number ";R ;"has been deleted "
: FOR T = 1 TO 1500: NEXT T
1630 GOTO 1500
1640 LPRINT CHR$(27);CHR$(31);CHR$(27);CHR$(19)
1650 CLS: LOCATE 10,10: PRINT "Check printer"
1660 LOCATE 12,10: INPUT "Press <ENTER> to print ",R$
1670 T$ = "HOUSEHOLD FURNISHINGS"
1680 GOSUB 2270
1690 R = 1 : GET #1,R
1700 LPRINT CHR$(27);CHR$(14);TAB(10);T$;CHR$(27);CHR$(15)
1710 LPRINT: LPRINT: LPRINT NFS
1720 LPRINT AF$
1730 LPRINT CYF$;" ";SF$
1740 CLOSE #1
1750 LPRINT STRING$(2,CHR$(10))
1760 LPRINT TAB(4); "Location"; TAB(15); "Item"; TAB(53); "Date "; TAB(62); "R#"; TAB(70
); "Cost"
1770 LPRINT TAB(50); "Purchased"
1780 LPRINT
1790 DIM D1$(12)
1800 D1$(1) = "GARAGE"

```

```

1810 D1$(2) = "KITCHEN"
1820 D1$(3) = "DINNETTE"
1830 D1$(4) = "DINING ROOM"
1840 D1$(5) = "FAMILY ROOM"
1850 D1$(6) = "LIVING ROOM"
1860 D1$(7) = "MASTER BR/BATH"
1870 D1$(8) = "# 2 BR/BATH"
1880 D1$(9) = "# 3 BR/BATH"
1890 D1$(10) = "BASEMENT"
1900 D1$(11) = "PATIO"
1910 D1$(12) = "YARD"
1920 GOSUB 1060
1930 R = 1 : M = 12 : N = 500
1940 FOR I = 1 TO M
1950 LPRINT CHR$(27);CHR$(14);D1$(I);CHR$(27);CHR$(15)
1960 LPRINT
1970 IF I = M THEN GOTO 2240
1980 R = 1
1990 FOR J = 1 TO N
2000 GET #1,R
2010 IF AF$ = STRING$(30,CHR$(32)) THEN GOTO 2200
2020 IF R = (LOF(1)/50) + 1 THEN GOTO 2220
2030 IF LEFT$(BF$,1) = "1" THEN X$ = "GARAGE"
2040 IF LEFT$(BF$,1) = "2" THEN X$ = "KITCHEN"
2050 IF LEFT$(BF$,1) = "3" THEN X$ = "DINNETTE"
2060 IF LEFT$(BF$,1) = "4" THEN X$ = "DINING ROOM"
2070 IF LEFT$(BF$,1) = "5" THEN X$ = "FAMILY ROOM"
2080 IF LEFT$(BF$,1) = "6" THEN X$ = "LIVING ROOM"
2090 IF LEFT$(BF$,1) = "7" THEN X$ = "MASTER BR/BATH"
2100 IF LEFT$(BF$,1) = "8" THEN X$ = "# 2 BR/BATH"
2110 IF LEFT$(BF$,1) = "9" THEN X$ = "# 3 BR/BATH"
2120 IF BF$ = "10" THEN X$ = "BASEMENT"
2130 IF BF$ = "11" THEN X$ = "PATIO"
2140 IF BF$ = "12" THEN X$ = "YARD"
2150 IF X$ <> D1$(I) THEN GOTO 2200 ELSE A = VAL(DF$)
2160 LPRINT TAB(15);AF$;
2170 LPRINT TAB(51);CF$;
2180 LPRINT TAB(62);R;
2190 LPRINT TAB(66) USING "$#####.##";A : S1 = S1 + A
2200 R = R + 1
2210 NEXT J
2220 LPRINT: LPRINT TAB(30); "Sub Total"; TAB(66) USING "$#####.##";S1 : T1 = T
1 + S1: S1 = 0
2230 NEXT I
2240 LPRINT
2250 LPRINT TAB(30); "TOTAL"; TAB(66) USING "$#####.##";T1
2260 CLOSE #1 : CLS : LOCATE 10,10: PRINT "End of File - End " : END
2270 OPEN "R",#1,"OWNER",90
2280 FIELD #1,30 AS NF$,30 AS AF$,15 AS CYF$,15 AS SF$
2290 RETURN
2300 COLOR 4,7,9 : CLS
2310 LOCATE 5,25: PRINT STRING$(25,"*")
2320 FOR I = 9 TO 8: LOCATE 1,25: PRINT "*": LOCATE 1,49: PRINT "*": NEXT I
2330 LOCATE 7,28: PRINT "HOUSEHOLD INVENTORY"
2340 LOCATE 9,31: PRINT "by E.H. Baade"
2350 LOCATE 11,35: PRINT "For"
2360 LOCATE 13,31: PRINT "TANDY 1200 HD"
2370 LOCATE 15,25: PRINT STRING$(25,"*")
2380 FOR T = 1 TO 2000: NEXT T : RETURN

```



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Searching for a quality computer with advanced graphics capabilities? Take a good look at the affordable Tandy 2000. The 2000 features high-resolution graphics to create razor-sharp graphs and diagrams in a brilliant array of colors.

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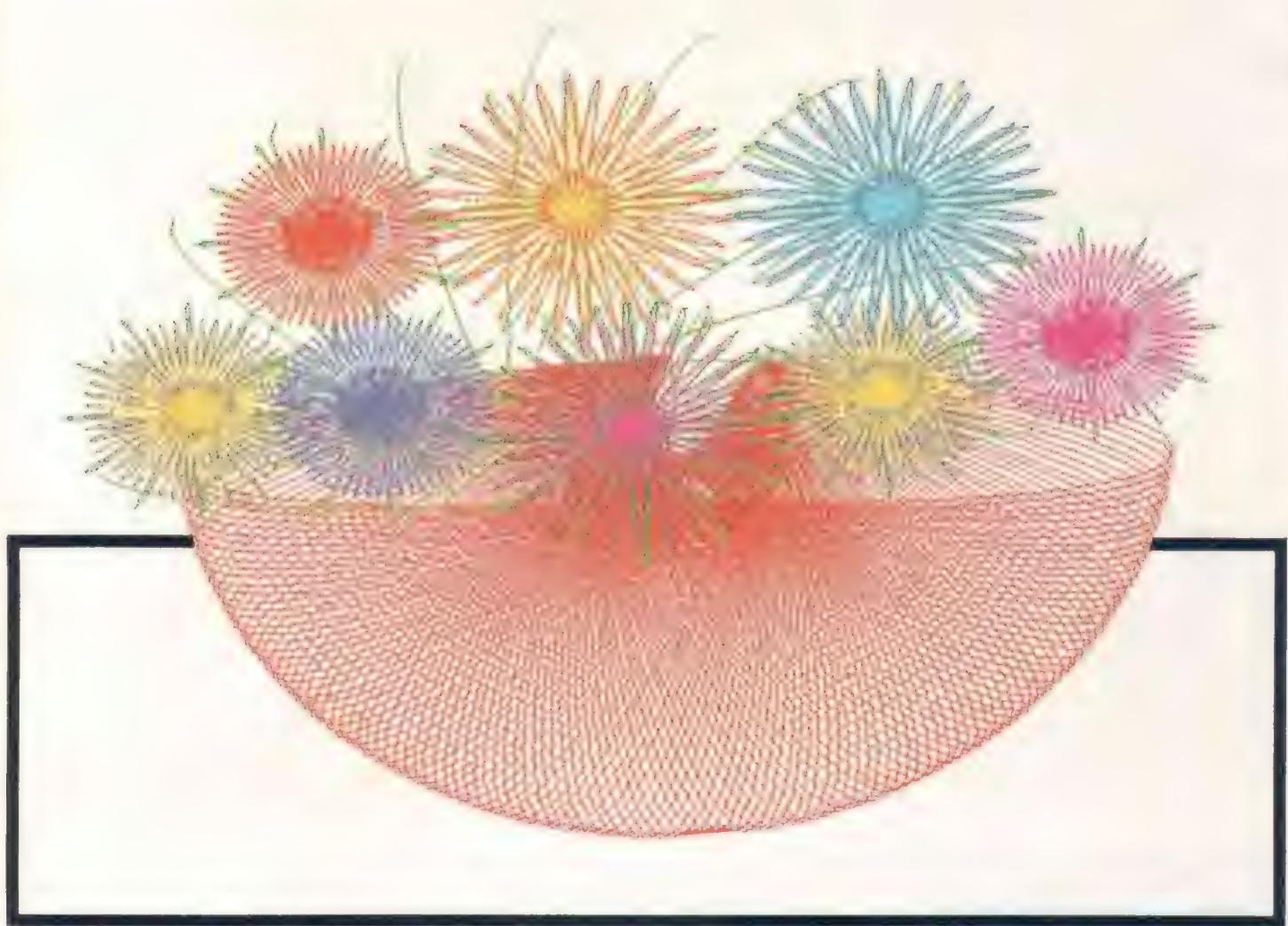
City

State  ZIP

Phone

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Corp. MS and XENIX/TM Microsoft Corp.

# The Gallery



With Wayne Sanders, Curator

This month's featured exhibit is another example of how mathematical functions can be used to create beautiful graphics. In this case, ellipses are used to form a basket of flowers on your Tandy 2000's color monitor. This program came to us from Leonard Guay of Jacksonville Beach, FL.

If you would like to have your graphics creation presented here, send it in on disk with a letter describing how it works. If possible, include instructions on how to make your program work on each Tandy MS-DOS machine. A winning gallery exhibit is chosen each month and the "artist" is awarded \$50. Address your entries to PCM Gallery, P.O. Box 385, Prospect, KY 40059.

```

10 ' Program by Leonard Guay-14750 Beach Blvd.#16
15 ' Jacksonville Beach,Fl. 32250
20 ' Submitted to:PCM-10/18/85 for approval.(THE GALLERY)
65 *****Ellipse Rotation/Transformation*****
75 ' Formula: (X-HT)^2/A^2+(Y-VT)^2/B^2=1
80 ' Trasform: X=A*COS(θ)+HT AND Y=B*SIN(θ)+VT
85 ' Change values <A>,<B> to modify curve and(ASP)
90 ' Value <TH> is rotation angle and <HT,VT> values of translation.
95 REM*****PROGRAM*****
100 KEY OFF:SCREEN 3:COLOR 0,0:CLS
110 PALETTE 1,2:PALETTE 2,12:PALETTE 3,22:PALETTE 4,9:PALETTE 5,13:PALETTE 6,11:
PALETTE 7,23
120 XL=-6:XR=6:YT=-4:YB=5 : Set Window
130 AL=ABS(XL):AR=ABS(XR):AT=ABS(YT):AB=ABS(YB)
140 SH=640/(AL+AR):SV=400/(AT+AB)
150 HT=θ:VT=θ:PI=3.14159
160 A=4.5:B=2.2:ASP=10/28:C=2:P=PI/128:CX=320:CY=200:S1=θ:E1=3:S2=.5*PI:E2=1.5*P
I:GOSUB 1010 :Draw Basket
170 A=4.5:B=2:ASP=10/28:C=1:P=PI/10:CY=280:S1=θ:E1=3.2:S2=θ:E2=.5*PI:GOS
UB 1010 :Greens
180 CX=90:CY=175:C=1 : First Flower(2)
190 A=1.2:B=1:ASP=1/28:P=PI/6:GOSUB 1000
200 CX=420:CY=190:GOSUB 1000
210 A=1:P=PI/24:C=4:GOSUB 1000
220 CX=90:CY=175:GOSUB 1000
230 A=.95:B=.85:ASP=.5/25:P=PI/24:C=3:GOSUB 1000
240 CX=420:CY=190:GOSUB 1000
250 CX=280:CY=90:C=1 : Second Flower(3)
260 A=1.5:B=1.5:ASP=1.5/28:P=PI/6:GOSUB 1000
270 CX=300:CY=200:GOSUB 1000
280 CX=430:CY=100:GOSUB 1000
290 A=1.4:B=1.3:P=PI/16:ASP=1.2/28:C=4:GOSUB 1000
300 CX=300:CY=200:C=7:GOSUB 1000
310 CX=280:CY=90:C=2:GOSUB 1000
320 A=1.2:B=.85:ASP=1/28:C=3:GOSUB 1000
330 CX=300:CY=200:C=5:GOSUB 1000
340 CX=430:CY=100:C=6:GOSUB 1000
350 CX=520:CY=170:C=1 : Third Fower(3)
360 A=1.2:B=1:ASP=1/28:P=PI/6:GOSUB 1000
370 CX=180:CY=180:C=1:GOSUB 1000
380 CX=160:CY=95:C=1:GOSUB 1000
390 A=1:B=.85:P=PI/30:C=2:GOSUB 1000
400 CX=520:CY=170:C=5:GOSUB 1000
410 CX=180:CY=180:C=4:GOSUB 1000
420 GOTO 420
1000 S1=θ:E1=3.2:S2=θ:E2=6.4
1010 FOR TH=S1 TO E1 STEP P:S1=SIN(TH):C1=COS(TH)
1020 FOR T=S2 TO E2 STEP .2:X=A*COS(T):Y=B*SIN(T)*ASP
1030 X1=X*C1-Y*S1+HT:Y1=X*S1+Y*C1+VT:IF T=θ THEN PSET(X1*SH+CX,CY-Y1*SV),C
1040 LINE-(X1*SH+CX,CY-Y1*SV),C:NEXT T:NEXT TH:RETURN

```

A crystal ball for your financial future

# IRA Projection

One of the best ideas the federal government has had in the last decade has to be the Individual Retirement Account (IRA). It gives the average person the chance to build a future retirement fund without taxation on the money he or she puts away.

People who are considering such accounts invariably wonder about just how it all adds up, and rightly so. I love to plug in various figures and watch the theoretical interest come pouring in. You can get some practical use out of my IRA projection program and, at the same time, kick around lots of figures just to be sure you are choosing the right investment plan and financial institution.

This program, *IRA Projection*, is a simple demonstration of the fact that programs do not need to be long and complicated to be useful. Nor do "serious" programs have to be boring. A little pizazz in the title screen adds a lot to overall program appearance.

The first portion of the program is dedicated to displaying a fancy title screen and giving the author his ego strokes. To make the large letters, I create strings using the DRAW command syntax. For example, Line 290 is a string needed to draw the large letter 'I' (X1\$). It is executed in the DRAW statement in Line 300. A touch of paint here and the title screen is finished.

*IRA Projection's* main program is built around a formula to calculate compounding interest on level install-

ments over a number of years (lines 710 through 720). To use the formula, the user provides the needed figures (how much, how often, what interest rate, etc.) for a projection. This is handled in lines 530 through 650.

Once the program has calculated the results, the problem becomes one of effective display of the data. Lines 730 through 1170 handle this chore, giving the user an option to get a hardcopy as well as on-screen data. If you are a novice programmer, you might like to take a look at the use of PRINT USING

By  
Leonard  
Hyre



to make the display format neat and useful. This command may be the most overlooked tool available to the new BASIC programmer, and it is one of the most powerful!

Typing in the program is a fairly simple matter; there are no long and complicated lines to check. Be careful in getting the syntax of PRINT USING correctly or the screen and printout could look jumbled.

I hope you find *IRA Projection* a useful addition to your software library. □

#### The listing:

```

10 ' ****
20 ' *  IRA PROJECTIONS  *
30 ' *      by L. HYRE   *
40 ' *      (c) 12/85    *
50 ' *
60 ' *  For TANDY MSDOS  *
70 ' *      Computers   *
80 ' ****
90 '
100 **** The TITLE SCREEN ***
110 '
120 KEY OFF:SCREEN 1,1:COLOR 0:CLS
130 '

```

```

140 '**** IF Your TANDY Is A Model 1200, 2000, OR 3000 DELETE Line 160 ****
150 '
160 PALETTE 1,2:           *** We need some GREEN -for 1000 ONLY! ***
170 DW$=STRING$(4,"$"):AC$=STRING$(17,"$"):BR$="$$ $$"
180 LINE(20,20)-(300,184),1,B,&H5555:*** Strange Borders ***
190 LINE(25,25)-(295,179),1,B,&H5555
200 LOCATE 7,12:PRINT AC$:LOCATE 8,12:PRINT AC$:LOCATE 12,12:PRINT AC$:LOCATE 1
3,12:PRINT AC$:LOCATE 17,12:PRINT AC$:LOCATE 18,12:PRINT AC$
210 LOCATE 9,12:PRINT DW$:LOCATE 10,12:PRINT DW$:LOCATE 11,12:PRINT DW$
220 LOCATE 14,25:PRINT DW$:LOCATE 15,25:PRINT DW$:LOCATE 16,25:PRINT DW$
230 LOCATE 9,25:PRINT DW$:LOCATE 16,12:PRINT DW$
240 LOCATE 5,18:PRINT BR$:LOCATE 6,18:PRINT BR$:FOR BR=9 TO 11:LOCATE BR,18:PRIN
T BR$:NEXT:FOR BR=14 TO 16:LOCATE BR,18:PRINT BR$:NEXT:LOCATE 19,18:PRINT BR$:LO
CATE 20,18:PRINT BR$
250 '
260 '
270 *** Create BIG Letters I, R and A ***
280 '
290 XI$="u10r10u50110u10r30d10110d50r10d10130"
300 DRAW"bm35,128;c3;xxi$;"
310 XR$="u70r60d30110f10d30110u30h10130d40110"
320 DRAW"bm125,128;c2;xxr$;"
330 LINE(135,65)-(175,80),2,B
340 XA$="u60e10r30f10d60110u30130d30110"
350 DRAW"bm230,128;c3;xxa$;"
360 DRAW"bm240,88;c3;u15e5r20f5d15130"
370 PAINT(38,125),1,3
380 PAINT(128,126),1,2
390 PAINT(233,125),1,3
400 LOCATE 22,6:PRINT "Individual Retirement Accounts"
410 FOR DL=1 TO 1000:NEXT:LOCATE 25,16:PRINT "by L. Hyre";
420 FOR DL=1 TO 2500:NEXT
430 '
440 *** The MAIN PROGRAM ***
450 '
460 SCREEN 9,1:WIDTH 80:COLOR 4,7
470 CLS:PRINT CHR$(201);STRING$(78,CHR$(205));CHR$(187)
480 PRINT CHR$(186);SPACE$(23);" Individual Retirement Account ";SPACE$(24);CHR$(
186);
490 PRINT CHR$(200);STRING$(78,CHR$(205));CHR$(188);
500 '
510 *** Get Needed Input ***
520 '
530 COLOR 9
540 A=0:B=0
550 LOCATE 6,6
560 INPUT"YOUR NAME";N$
570 LOCATE 8,6
580 INPUT"TOTAL DEPOSIT PER YEAR";C
590 LOCATE 10,6
600 INPUT"ANTICIPATED % INTEREST";D
610 LOCATE 12,6
620 INPUT"NO. TIMES COMPOUNDED/YR";E
630 LOCATE 14,6
640 LG=5
650 INPUT"NO. YEARS TO PROJECT";F
660 '
670 *** OUTPUT RESULTS TO SCREEN ***
680 '

```

```

690 CLS:GOSUB 880
700 FOR G=1 TO F
710 A=(1+D/(100*E))^E*(A+C)
720 B=FIX((100*A)+.5)/100
730 LOCATE LC,8
740 PRINT USING"##";G;:PRINT USING" #####.##";B
750 LC=LC+1
760 IF LC=15 THEN LC=5
770 IF G/10=INT(G/10) THEN GOSUB 900
780 NEXT G
790 PRINT:PRINT"Your Total Deposit Would Be ";:PRINT USING" #####.##";C*F
800 PRINT"Net Increase Would Be ";:PRINT USING" #####.##";B-(C*F)
810
820 *** PRINTER OPTION OFFERED ***
830
840 PRINT:PRINT"Press 'P' For PRINTOUT"
850 PRINT"Any Other Key For Another Projection!"
860 AN$=INKEY$:IF AN$=""THEN 860
870 IF AN$="P" OR AN$="p" THEN 980 ELSE 470
880 XA$="IRA Projection for:";XX$=XA$+N$:LOCATE 1,1:PRINT XX$
890 RETURN
900 LOCATE 6,40:COLOR 4:PRINT"< Press any key to continue >"
910 LOCATE 7,40:PRINT"                                         ":COLOR 0
920 AN$=INKEY$:IF AN$=""THEN 920
930 CLS:PRINT XX$  

940 RETURN
950
960 *** PRINTOUT ROUTINE ***
970
980 CLS
990 PRINT:PRINT"PRINTING OPERATION IN PROGRESS"
1000 PRINT"ONE MINUTE PLEASE!"
1010 LPRINT STRING$(80,"-")
1020 LPRINT"INDIVIDUAL RETIREMENT ACCOUNT PROJECTION FOR: ";N$  

1030 LPRINT "BASED ON DEPOSITS OF $";C;" OVER ";F;" YEARS"
1040 LPRINT "ANTICIPATED INTEREST RATE IS ";D;"% COMPOUNDED ";E;" TIMES/YEAR"
1050 LPRINT STRING$(80,"-")
1060 H=0
1070 A=0:B=0
1080 FOR G=1 TO F
1090 A=(1+D/(100*E))^E*(A+C):B=FIX((100*A)+.5)/100
1100 LPRINT TAB(25);
1110 LPRINT "YEAR # ";:LPRINT USING"##";G;:LPRINT"      ";:LPRINT USING" #####.##"
";B
1120 NEXT G
1130 LPRINT:LPRINT TAB(13);"TOTAL DEPOSITS=";:LPRINT USING" #####.##";C*F;:LPRI  

NT" FOR NET INCREASE OF ";:LPRINT USING" #####.##";B-(C*F)
1140 LPRINT:LPRT STRING$(80,"-")
1150 PRINT"OPERATION COMPLETED"
1160 PLAY"04C"
1170 FOR DL=1 TO 400:NEXT
1180
1190 *** DO ANOTHER PROJECTION? ***
1200
1210 LOCATE 23,6:PRINT"Do you want another projection ? ( Y/N )"
1220 AP$=INKEY$:IF AP$=""THEN 1220
1230 IF AP$="Y" OR AP$="y"THEN 470
1240 IF AP$="N" OR AP$="n"THEN END
1250 GOTO 1230

```

*This program won't help you beat the high cost of living, but at least you'll know what to expect.*

# Inflation Tracker

By James Ray

**L**oss of our American buying power due to inflation is something that we have all grown accustomed to expect. Regrettably, it is something that we all have to deal with as no one is able to escape its effect.

Inflation is related to a number, or index, that the government gives on a monthly basis that reflects the increase (or decrease) in the average cost of certain goods and services. These goods usually include food prices, gasoline prices, housing costs and utilities. The changes in the cost of these goods are added together and averaged over the year to give us what we call "the annual inflation rate."

Between the years of 1972 to 1985, the annual inflation rate has averaged 7.3 percent. The highest

*James Ray is a minister at the Cooper River Baptist Church in North Charleston, South Carolina. Computer programming is a hobby along with woodworking and water skiing. James has also written several programs for the Tandy Color Computer.*



# Enhance your Tandy Portable

Your Radio Shack Model 100 (26-3802, \$499.00) or Tandy 200 (26-3860, \$799.00) are the heart of a complete computer system. We back both machines with all the extensive accessories to make them not only convenient portables, but powerful desktop tools, too.

## Get rapid disk storage

The Tandy 200/Model 100 Portable Disk Drive (26-3808, \$199.95) gives you fast access to 100K of data on 3½" floppy diskettes. And since it's battery powered\*, you don't have to leave your important documents, reports, spreadsheets, statistics and other vital data back home. You can take them with you wherever they're needed.

This portable drive may be small, but it's not a toy. Menu-driven operation makes it easy to

use. You can get a complete list of files for any disk. It features these powerful operating system functions: FORMAT, SAVE, LOAD, RENAME and BACKUP. A 19,200-baud data-transfer rate easily beats the speed of cassettes. And you can choose battery operation, or just attach an optional adapter to use AC power. And for today's traveling businessperson, there's a convenient Portable Drive Case (26-3815, \$24.95).

## Portable printing

Like the Portable Disk Drive, the TRP 100 Thermal Ribbon Printer (26-1275, \$299.95) is made to be used anywhere—it runs on both batteries\* or AC

power, and it only weighs 5½ pounds. Heat from the super-quiet thermal head transfers high-contrast characters onto plain 8½" paper. You can also use thermal roll paper without the ribbon for direct transfer.

## High-speed data communications

One of the most exciting features of both the Tandy 200 and Model 100 is the built-in modem that lets you communicate with other computers over the phone line. Our Direct-Connect Modem Cable (26-1410, \$19.95) comes with one free hour on both the CompuServe Information Network and the Dow Jones News/Retrieval Service.



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year of inflation during this period was in 1980 at 13.5 percent and the lowest year during the same period was in 1972 at 3.3 percent.

I was interested in the relationship between my earnings and the effects of inflation on those hard earned dollars. Suppose you made \$10,000.00 in 1972. What would you need to earn in 1986 to have the same buying power as in 1972? The answer: \$26,705.98. (Maybe this program was not such a good idea!)

The inflation rate is a summary of the change in the cost of certain goods and services. These changes do not affect everyone in the same manner. For example, suppose in a given year, housing costs increase a whopping 15 percent. This 15 percent would be reflected in the annual inflation rate; however, for people not buying a house, it would have no direct effect on their buying ability. Likewise, should food costs increase dramatically, it would affect a household of seven more than a household of two.

#### Operation

The program menu will give you four options. The first option is a straight inflation application (see Figure 1). This application is used for the period between the years of 1972 and 1985. You will be asked to enter the year to begin the application and the amount to be compared. The application is estimating a 3.7 percent inflation rate for 1985. When the exact rate is known, you can place it in Line 190 (first number).

The second option is a projection application and you are not required to stay in the 1972 through 1985 range. With this application, you can begin with any year, end with any year, and select any inflation rate you choose. For example,

suppose you want to estimate what you will need to earn in the year 2000 to keep up with inflation. Suppose you will make \$26,705.98 in 1986 and you are estimating that the inflation rate between the years of 1986 and 2000 will average 4 percent (wishful thinking?). You will need \$46,246.10 in the year 2000 (see Figure 2). Note that this is an estimate.

This is an excellent application for insurance personnel who need to estimate future needs for their clients.

Printing a hard copy of any of the charts is simple with the Tandy computers. When you have the chart or application on the screen that you desire, press SHIFT-PRINT to get a printout.

The third menu option is a tutorial and gives some assistance with the program even though the program is very friendly and gives appropriate prompts. I like this kind of information in the program so you do not have to refer back to the magazine for instructions.

The fourth option is the end option and not only ends the program but erases it from memory. If you are typing this in, be sure to save as you go along!

The inflation rates used in this program were obtained from the U. S. Department of Commerce in Washington, as printed in *News and World Report Magazine*. I will admit that I have seen other figures mentioned when referring to the inflation rates. If you find other rates you want to use, replace the figures in Line 190.

This program is available on PCM ON DISK or directly from me for \$15. Contact me if you are interested in future upgrades. Write to 5065 Frances Avenue, N. Charleston, SC 29406. Enjoy!

#### The listing:

```
10 'BY J. D. Ray
20 ' 5065 FRANCE AVENUE
30 ' N. CHARLESTON, S.C. 29406
40 ' <C> COPYRIGHT JAN., 1985
50 'VERSION 2.1
60 KEY OFF
70 CLS:COLOR 10,0,10:LOCATE 7,36:PRINT"INFLATION"
80 FOR Z=1 TO 250 :NEXT Z
90 LOCATE 9,39:PRINT"by"
100 LOCATE 11,36:PRINT"James Ray"
110 LOCATE 12,32:PRINT"5065 France Avenue"
120 LOCATE 13,29:PRINT"N. Charleston, SC 29406"
130 COLOR 12,0:LOCATE 24,34:PRINT"Copyright 1985";
140 FOR J=1 TO 950 :NEXT J
150 CLEAR 100
160 DIM INF(15),A(12),R(12),M(50)
170 FOR X=1 TO 15 :READ INF(X):NEXT
180 'INFLATION RATES LISTED IN 180 ARE FOR 1985-1972, IN THAT ORDER
190 DATA 3.7,4.0,3.8,6.1,10.4,13.5,11.3,7.7,6.5,5.8,9.1,11.0,6.2,3.3,0
200 Q=0 :D=0 : SIG=0
210 H$="#####.##":P$="##.##":Z$="$$$$##,##.##"
220 T$="$$$$##,##.##":D$="#######.##":E$="##.##"
230 STA$="Actual Inflation"
240 PRO$="Projected Inflation"
250 K$="Application"
260 YEARS$=""
```



```

270 CLS:COLOR 11,0,11:LOCATE 7,30:PRINT"Program Application"
280 LOCATE 11,30:PRINT"<1> .:;:PRINT STA$
290 LOCATE 12,30:PRINT"<2> .:;:PRINT PRO$
300 LOCATE 13,30:PRINT"<3> Tutorial"
310 LOCATE 14,30:PRINT"<4> End"
320 LOCATE 16,30:PRINT" Selection #:"
330 MENU$=INKEY$ :IF MENU$="1" THEN GOTO 370
340 IF MENU$="2" THEN GOTO 670
350 IF MENU$="3" THEN 940
360 IF MENU$="4" THEN 900 ELSE 330
370 'Straight Application Routine
380 CLS:COLOR 6,0:LOCATE 7,29:PRINT"Straight Application"
390 COLOR 15,0:LOCATE 9,25:PRINT"Enter Year To Begin Application"
400 LOCATE 10,31:PRINT"Between 1972-1986"
410 LOCATE 12,25:INPUT "Enter Year (19xx):"; YEAR
420 IF YEAR<1972 OR YEAR>1986 THEN LOCATE 15,22,0:COLOR 20,0:PRINT" PLEASE USE
YEAR BETWEEN 1972 - 1986!":SOUND ON:NOISE 0,8,12:FOR CC=1 TO 1500:NEXT CC:LOCATE
15,22:PRINT SPACES(40):COLOR 15,0:GOTO 390
430 X=1986-YEAR :KK=X :YR=YEAR
440 LOCATE 14,25:PRINT"Enter Amount To Begin Application:"
450 LOCATE 15,25:INPUT "Amount $ ";A
460 AM=A
470 IF A<0 THEN LOCATE 18,25,0:COLOR 20,0:PRINT"ENTER A POSITIVE AMOUNT - PLEASE
":NOISE 0,8,12:FOR CC=1 TO 1500:NEXT CC:LOCATE 18,25:PRINT SPACES(34):COLOR 15,0
:GOTO 450
480 CLS:COLOR 6,0,0:PRINT TAB(6) "DATE: ";DATE$;" INFLATION";"
TIME: ";TIME$;""
490 LOCATE 3,6:PRINT"Based On";:PRINT USING Z$;AM;:PRINT" in"YR;"the following A
mount is Needed to Keep":LOCATE 4,6:PRINT"in Line with Inflation: (RATE listed
is for previous year)"
500 LOCATE 6,8:PRINT"YEAR: RATE: INCREASE ADJ. TOTAL":COLOR 15,0
510 L=7 :N = 7
520 I=0
530 LOCATE L,N:PRINT YEAR,TAB(41);:PRINT USING Z$; A
540 YEAR=YEAR+1
550 I=A*INF(X)/100 :A=A+I
560 L=L+1
570 LOCATE L,N:PRINT YEAR,:PRINT USING H$;INF(X);:PRINT"%",:PRINT USING H$;I,:PR
INT":"::PRINT USING Z$; A
580 YEAR=YEAR+1 :X=X-1
590 IF YEAR>1986 THEN 610
600 GOTO 550
610 LOCATE 23,12:COLOR 24,0:PRINT"Hit <ENTER> for Menu";:LOCATE 23,35:PRINT"Pres
s <SHIFT> <PRINT> for Hardcopy";:COLOR 15,0
620 E$=INKEY$ :IF E$="" THEN 610
630 GOTO 200
640 FOR P=1 TO 500 :NEXT P
650 GOTO 200
660 'PROJECTED INFLATION APPLICATION
670 CLS:D=0
680 PRINT TAB(34) "PROJECTION"
690 LOCATE 3,5:PRINT"This is a Projection of the effects inflation will have on
your dollars":LOCATE 4,5:PRINT"in the Future. You will need to enter the year t
o begin the":LOCATE 5,5:PRINT"Projection, the Amount, and the Year to end the Pr
ojection."
700 LOCATE 6,5:PRINT"You will need to Estimate the Inflation Rate for the period
. There":LOCATE 7,5:PRINT"are no year limitations to this application. THIS IS
AN ESTIMATE!!"
710 COLOR 10,0:LOCATE 9,12:PRINT"Enter the Year to Begin the Projection: ";:COLO

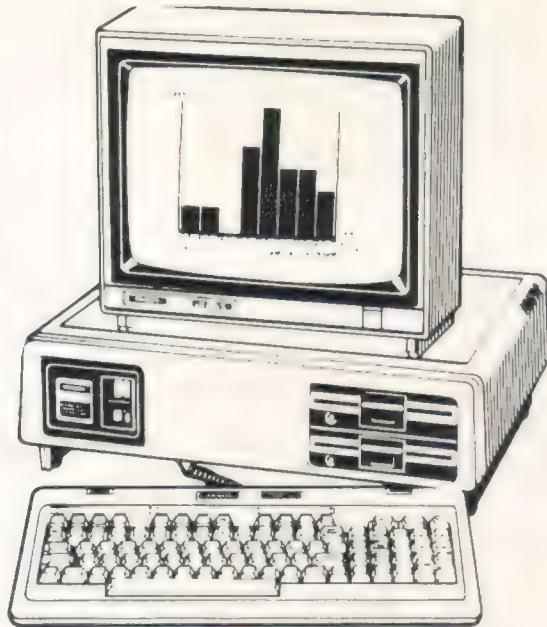
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```

R 15,0:INPUT YR
720 COLOR 10,0:LOCATE 11,5:PRINT"Enter the Amount to be used in the Projection:
";:COLOR 15,0:INPUT AP
730 COLOR 10,0:LOCATE 13,14:PRINT"Enter the Year to end the Projection: ";:COLOR
15,0:INPUT YS
740 COLOR 10,0:LOCATE 15,2:PRINT"Enter the Average Est. Inflation Rate (Per Year
):";:COLOR 15,0:INPUT RATE
750 P=YS-YR
760 FV=AP*(1+RATE/100)^P
770 D=0:CLS:COLOR 6,0:PRINT TAB(34)"PROJECTION", DATE: ";DATE$
780 LOCATE 5,17:PRINT"Beginning Year: "
790 LOCATE 7,25:PRINT"Amount: "
800 LOCATE 9,17:PRINT"Est. Inflation: "
810 LOCATE 11,4:PRINT"Amount Needed in Year"YS: "
820 COLOR 15,0
830 LOCATE 5,35,0:PRINT YR
840 LOCATE 7,34,0:PRINT USING Z$;AP
850 LOCATE 9,35,0:PRINT USING P$;RATE;:PRINT" % per year"
860 LOCATE 11,34,0:COLOR 31,0:PRINT USING Z$; FV:COLOR 15,0
870 LOCATE 23,12:COLOR 24,0:PRINT"Hit <ENTER> for Menu";:LOCATE 23,35:PRINT"Pres
s <SHIFT><PRINT> for Hardcopy";:COLOR 15,0
880 E$=INKEY$:IF E$="" THEN 880
890 GOTO 200
900 END ROUTINE
910 CLS:PRINT:INPUT"Are you sure? Program will be ERASED!! (Y/N) ";ED$
920 IF ED$="Y" OR ED$="y" THEN END:NEW
930 IF ED$="n" OR ED$="N" THEN GOTO 200
940 CLS:COLOR 14,0,14:PRINT TAB(35)"INFLATION"
950 LOCATE 3,1:PRINT" This program attempts to provide the user with the effects
of inflation on your hard earned dollars. This program can be used in two
ways: "
960 PRINT" ":PRINT" 1) The Actual Application lets you see the effects of inflat
ion between the years of 1972 - 1985. The annual inflation rates are lis
ted with the application. The inflation rates used here were found in
the U.S."
970 PRINT" NEWS AND WORLD REPORT Magazine: "
980 PRINT" "
990 L=11:X2=14
1000 FOR X1=1972 TO 1985:LOCATE L,12:PRINT X1;" ";:PRINT USING P$;INF(X2);:PRI
NT "%":L=L+1:X2=X2-1:NEXT X1
1010 FOR S1=0 TO 14:TT=INF(S1)+TT:NEXT
1020 TT=TT/14 :LOCATE 15,40:PRINT"AVERAGE: ";:COLOR 30,0:PRINT USING P$;TT;:PRIN
T "%"
1030 COLOR 14,0:LOCATE 23,35:PRINT "HIT <ENTER> TO CONTINUE";
1040 E$=INKEY$:IF E$="" THEN 1040
1050 CLS:PRINT:PRINT" 2) The PROJECTION APPLICATION allows the user to use any y
ear and any inflation rate to project future effects of inflation o
n our American dollar.
1060 PRINT:PRINT" 3) END will erase the program from memory."
1070 PRINT:PRINT" Remember that Inflation rates are averages of the actual incre
ases in certain consumer products. They reflect the average yearly cost of fo
od, housing, utilities, and other essentials."
1080 PRINT:PRINT" ENTER years as 19XX and dollar amounts without commas. Inflat
ion rates should be listed as whole numbers. (5% = 5, 7 1/2% = 7.5)"
1090 PRINT:PRINT" For a print-out of charts, press <SHIFT> <PRINT> when the char
t you want is on the monitor screen."
1100 LOCATE 23,23:PRINT"Hit <ENTER> to Return to Menu"
1110 E$=INKEY$:IF E$="" THEN 1110
1120 GOTO 200

```

Add zip to your *BASIC* programs with the *GW-BASIC* compiler

# Compiling BASIC Programs

By Robert D. Covington

**A**s a computer language, BASIC always seems to be looked down upon as a good language for developing programs. For some reason, if you tell some people that you wrote a program in BASIC, they seem to think that the program is not very good and operates at a slow speed.

Of course, if you were to take that same program, make a few changes and compile it in C, FORTH, ADA, PASCAL or any other "respectable" language, these people would automatically think that the program is faster and more useful.

Why has BASIC achieved such a bad reputation? From what I can tell, there are two main reasons for BASIC's bad image. First, because of BASIC's flexibility, poorly structured programs can be created and will still work. When "professional" programmers look at the code, they are appalled by its lack of structure and assume that any language that could support such "trash" is automatically bad. I am not saying the non-structured programs are bad, just that they seem to be looked down upon by some programmers.

The second problem with BASIC is that many think it is a slow language. Sure, when you are running BASIC in an interpreted mode, programs tend to run rather slowly. What most people seem to forget is that *any* language runs slowly in an interpreted environment. Unfortunately, it is easy to forget that compiler BASICs exist since there are so many more interpreted BASICs. Fortu-

nately, though, compilers do exist for BASIC that allow BASIC programs to run as fast or sometimes even faster than programs written in other high level languages.

This brings us to the topic of this month's Subroutine City — compiling BASIC programs. To help exemplify the compiling process, I will describe in detail how to compile last month's *DB11* database system.

Before I get into the compiling, let me first make a few comments about *DB11*.

## DB11 Modifications

Listing 1 contains a few lines of code that need to be added to the existing *DB11* subroutine module. Since this module was merged with each of the other modules in the database, all four main modules (*MAIN.BAS*, *DBFORM.BAS*, *DATAMAN.BAS* and *PRINT.BAS*) need to incorporate these changes.

The easiest way to do this is to type in Listing 1 in BASIC, save the file in ASCII format (*SAVE "CHANGES.BAS", A*) and merge that file with the other *DB11* modules (*LOAD "MAIN", MERGE "CHANGES", SAVE "MAIN"*). Once this process is complete, the dummy file can be deleted.

Listing 2 contains a few additional lines that need to be added to each of the individual *DB11* modules.

In addition to these line additions, the *DB11* module named *PRINT.BAS* also requires that lines 51100 through 51105 be deleted.

These changes to *DB11* serve three major purposes. First, the changes in lines 15 through 22 in each of the modules reduce the amount of memory needed to store array information and gives BASIC more room for string data. This in effect reduces the number of "garbage collections" (reorganization of the string space) and thus increases the system speed. Second, the changes in Listing 1 incorporate the new MS-

DOS access subroutine into the *DB11* database system. The benefits of this new subroutine will be described later in this article. Lastly, the remaining changes fix a few bugs, typos and errors that were in the *DB11* database system as published.

## The *GW-BASIC* Compiler

While *DB11* operates at a usable speed in interpreted BASIC, the database does not have the "lightning fast" response time that really makes a program much easier to use. To give *DB11* the extra speed it really should have, the system needs to be compiled into machine language by a *GW-BASIC*-compatible compiler.

Before I describe compiling *DB11*, let me stop for a moment and describe what compiling is and describe some of its pros and cons.

Normally, when you type *BASIC* or *BASICICA* at the MS-DOS prompt, a BASIC language interpreter is loaded. This interpreter is responsible for "translating" the BASIC code that you give it into code the CPU can understand. For every instruction executed, the BASIC interpreter must:

- Load the next instruction and check to see if it is a legal BASIC instruction.
- If the instruction is not legal, it checks to see if it is a variable assignment.
- If the instruction is a legal BASIC command, it checks to see if the instruction has any parameters and proceeds to convert them into something it can understand. For example, if you told BASIC to *PRINT 3+5*, it would convert the *3+5* into a binary representation of eight.
- BASIC then checks to see if the parameters that are needed to execute the instruction are all present and that they are within proper bounds.
- If the parameters provided are in

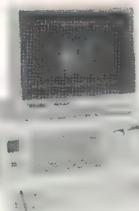
*Bob Covington has been a computer programmer and consultant for the past six years, most recently focusing his attention on both the Model 100 and the 2000. He is also a technical writer and editor. Bob can be contacted at P.O. Box 37007, St. Louis, MO 63141.*

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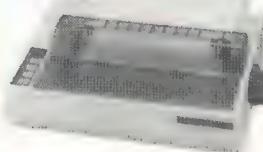
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formula form, the interpreter not only has to interpret the algebraic formula but must also change all the variables to manageable precisions before performing the calculations. In addition, since multiple precisions are supported, BASIC must determine which math routine is used for the precision currently being used in the calculation.

- Finally, BASIC executes the actual code associated with the instruction and then repeats this process until the program ends. Of course, throughout all of these phases of an instruction's execution, the computer must check to see if the **BREAK** key is being pressed.

As you can see, BASIC does quite a bit of work for each instruction it executes. A large percentage of this work ends up being used for checking syntax, converting data, finding variables, finding which instructions need to be executed and other overhead.

When a program is compiled, however, this overhead is greatly reduced and in most cases eliminated. During the compiling phase, it performs the following operations:

- It ignores remarks, extra spaces, tabs, etc., that make programs easier to read but use up space and time in normal interpreted BASIC.
- Performs all syntax checking associated with an instruction.
- Evaluates and optimizes as many algebraic formulas as possible. This means that instructions such as **PRINT**  $3+5$  are automatically converted into **PRINT** 8.
- Converts any constants to binary data. This means BASIC does not have to keep converting numbers to binary before evaluating instructions.
- Determines the precision used by each algebraic formula so that only the routines necessary to evaluate the formula in a particular precision are used. For example, when evaluating  $A\%+B\%$ , only the integer addition routines are added to the code. The resulting code does not have to check the precision of  $A\%$  and  $B\%$  and decide which math routine to use.
- Converts the BASIC instructions directly into machine language. This "pre-interpretation" allows the CPU to directly execute the BASIC code without it having to be interpreted by another program. This means that the time used to interpret the command is eliminated.
- **GOTO** instructions are directly converted into machine language jump instructions.

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When the compiling process is complete, the compiler produces a machine language object module of the BASIC program. Because of the optimization, programs end up running five to 50 times faster. Unfortunately, since most BASIC instructions require at least three to 15 bytes of machine language code, the compiled programs end up being quite a bit larger than their interpreted counterparts.

Another problem with the *Microsoft GW-BASIC Compiler* sold by Radio Shack is that it is not 100 percent compatible with the interpreted BASIC. In most cases, these problems are caused by enhancements and usually can be circumvented. Some of the differences between the GW-BASIC compiler and the interpreter are:

- Strings in the compiler can hold 32,767 characters instead of 255. Because of this, the string descriptor for all of the strings used by the compiled BASIC program contain an extra byte to describe the string's length. Programs that use peeks to find the location of the string and programs that use machine language subroutines need to be changed to account for this.

- All BASIC immediate mode commands such as LIST, RUN, EDIT, etc., are not supported by the compiler. In addition, the program instructions BLOAD, BSAVE and ERASE are also not supported.

- The maximum number of characters per line for the compiler is 252 instead of 255.

- Double-precision variables can be used in FOR/NEXT loops by the compiler unlike interpreted BASIC.

- Double-precision numbers can be used with all math operations and transcendentals.

- Garbage collections are not as frequent.

- The CHAIN instruction's power is greatly reduced by the compiler. Most programs that heavily use overlays require quite a bit of reworking to work with the compiler.

- RUN now executes .EXE files instead of .BAS files. Since other compiler BASIC programs are also .EXE files, this change makes sense. This difference does require, however, that you either omit the .BAS extension on a RUN or change it to .EXE.

- The machine language to BASIC interfaces are handled differently with the compiler. These differences will be described later in detail.

- All POKE, PEEK and USR instructions *must* be preceded by a DEF SEG instruction to work properly in compiler BASIC. This fact is very important and is not very well documented in the BASIC compiler manual.

There are other, more subtle, differences between compiler BASIC and interpreted BASIC, but the above are the most significant ones.

The major incompatibility problem comes primarily with machine language subroutines. In interpreted BASIC, the

first parameter (always a variable) specifies the address of the machine language program. Then, when the CALL instruction is performed, a long CALL is made to the address created by the last DEF SEG instruction and the variable specified in the CALL instruction.

With compiler BASIC, however, machine language programs are integrated into the compiled BASIC object file with MS-DOS's LINK utility.

To support this, the compiler assumes that the text following a CALL instruction is the name of the machine lan-

guage procedure (subroutine). This name is not a variable and cannot be treated as such in the program. For example, before compiling one of the subroutines that use my machine language access subroutine, the part of the program that locates the machine language subroutine in memory for the variable after the CALL would need to be eliminated.

To properly integrate machine language subroutines in the GW-BASIC compiler, the subroutine must abide by the following rules:

- The entire machine language subroutine must be defined as a far procedure. The name of the procedure must match the name used after the CALL instruction in the BASIC program.

- The procedure/subroutine name needs to be defined as a PUBLIC reference.

- The subroutine must be 100 percent relocatable (be able to be stored anywhere in memory) and require no modifications by the BASIC program. For example, the machine language access subroutine described in this column required that the interrupt number be changed by the BASIC program. This type of programming is illegal with the BASIC compiler.

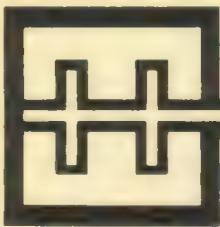
- Any references to strings must support the 4-byte string descriptor

instead of BASIC's 3-byte descriptor. The first two bytes of a string's descriptor in the compiler contain the length of the string and the last two bytes contain the address of the string in the current data segment.

- None of the segment registers must be modified by the machine language subroutine. In compiler BASIC, the code segment (CS) and data segment (DS) are almost always different but the string segment (ES) and the data segment (DS) are usually identical. In any event, modifying the segment registers will almost definitely cause the compiled program to crash.

- The BP register *must* be preserved by the machine language subroutine. In normal interpreted BASIC, BP should be preserved but it will usually not cause too many problems if it is destroyed. In compiler BASIC, however, there is no option; BP must be saved. To be on the safe side, BP should always be saved with either BASIC.

- String lengths should not be altered by machine language subroutines. In standard GW-BASIC, you might have been able to get away with modifying



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the string length, but in compiler BASIC, it causes many problems. A good rule of thumb for any GW-BASIC machine language subroutine is to use only BASIC to change the length of a string. One way of doing this is to return the desired length of the string to BASIC in an integer variable and use BASIC's LEFT\$ to change the string's length.

• The machine language subroutine must abide by all the rules associated with a machine language subroutine in interpreted BASIC. For more information on these rules, see my July 1985 installment of Subroutine City in PCM.

• The machine language subroutine must be assembled into an .OBJ file for linking with the compiled BASIC program. Because of this, machine language programs that are "hand assembled" or assembled with DEBUG must be re-assembled with the *Microsoft Macro Assembler* (sometimes it seems like Microsoft is trying to monopolize the compiler business).

If the machine language subroutine can meet the above requirements, then installing the subroutine is usually fairly easy. Unlike interpreted BASIC, compiler BASIC does not require that you load the subroutine into memory and locate its address. As a matter of fact, only the compiler and linker have any control over where the subroutine goes in memory.

### Compiling BASIC Programs

The first step in compiling a program is usually entering and checking the program in interpreted BASIC. While interpreted BASIC is fairly slow, debugging is much easier and faster. Of course, if you are developing a program that eventually will be compiled, make sure not to use any instructions or features that are not supported by the compiler. Most importantly, do not use PEEKs and POKEs to find information from BASIC's internal system memory. All of these addresses change or are eliminated with the compiler. If PEEKs and POKEs are used, make sure they only address MS-DOS system memory which usually does not change between languages or programs.

Once the program is created and thoroughly debugged, check that no lines are longer than 252 characters and save the program in ASCII format. This is done using the **SAVE "filename"**, A instruction in GW-BASIC.

Next, return to DOS and execute the compiler. When the compiler starts up, it asks for the source, object and source

listing filename. The source filename describes the BASIC program that is to be compiled. The object filename describes the .OBJ file that is created by the compiler which will contain the machine language instructions for the BASIC program. The source list filename describes an optional listing that can be generated by the compiler during compiling. Any compiling errors that are detected are printed on the listing along with the code compiled. In addition, this listing can optionally contain the actual machine language source code generated by the compiler for the BASIC program. This source code, while interesting, is usually very long and never needed for anything practical.

In addition to these three prompts, the compiler supports 10 compiler switches that can be entered at any of the three compiler prompts. All of these commands begin with a slash and should be entered after any filename entry. The 10 compiler options supported by the compiler are:

• /4 and /T — These switches are used for compiling programs that were designed to run under M-BASIC, Microsoft's 8-bit computer BASIC interpreter.

• /E and /X — These switches are used to tell the compiler that error checking routines are used in the BASIC program. The /E switch allows ON ERROR GOTO and RESUME *line number* instructions to be compiled correctly. The /X switch allows ON ERROR GOTO and any RESUME instruction to be compiled. If the /E switch is used and a RESUME or RESUME NEXT instruction is encountered during compiling, the compiler generates an error. The only advantage of the /E switch is that it generates less code than the /X switch. In other words, do not use the /X switch unless you need it. Programs that do not use any error checking routines and use neither of these switches tend to be noticeably shorter.

• /A — This switch tells the compiler to include the source code for the actual machine language instructions generated during compiling on the source listing. This option is usually only used by true "hackers" who cannot sleep unless they know what the code generated by the compiler looks like in machine language. In most cases, this option is not used since it creates a huge source listing.

• /D — This switch adds extra code to the compiled program to aid in debugging. When this option is used,

line numbers and bound checking (array and variable) code is added to the resulting compiled program. This switch must be used if you are using the TRON or TROFF instructions and if you want line numbers to be displayed when errors are detected. This option is great for debugging but should always be omitted in the final program since this switch increases the size of the compiled program.

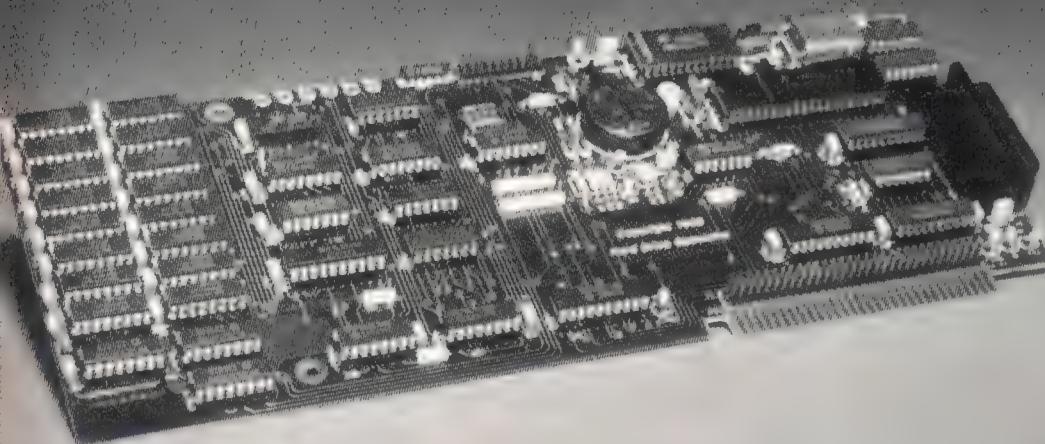
• /N — This switch eliminates the need for line numbers on every line of your BASIC program. When this option is selected, line numbers are only needed for specifying locations for GOTOS, GOSUBs and other line-oriented instructions. This switch is great for creating BASIC programs with the "structured look." The only problem with using this flag is that you cannot create BASIC programs without line numbers on every line in normal GW-BASIC. This means that you have to use EDLIN, a word processor, or a text editor for entering the program. If this option is used, make sure that all of the lines still use less than 252 characters per line.

• /R — This switch tells the compiler to store arrays in row-major order instead of column-major order. In most cases, this switch is never used unless you are converting a program from another high level language to the BASIC compiler.

• /S — This switch tells the compiler to store strings on disk as they are encountered instead of storing them in memory during compiling. Normally when this switch is not used, text strings are stored in memory during the compiling phase. If an identical text string is found, the compiler detects this and only writes one copy of the text string on disk when it finishes compiling. In most cases, not using this option will reduce the size of the resulting compiled program. The only time this option is used is when there is not enough memory in the system for the compiler to store the text strings and its own internal data. In other words, the /S switch is usually used to compile large programs with little memory.

• /O — This switch tells the compiler to use the BASCOMG.LIB instead of the run-time library BASRUNG.LIB. Normally, when this switch is not used, the BASIC compiler assumes that a program called BASRUN G.EXE will be on the disk along with the compiled program. When the compiled program is executed, it automatically loads the BASRUN

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**G.EXE** file into memory at the same time. This program is responsible for providing a set of common subroutines that can be utilized by the compiled program. For example, instead of the compiled program containing all of the code necessary to execute a **PRINT** statement, the program just executes a long **CALL** to the subroutine in **BASRUNG.EXE** that contains all of the necessary code for executing a **PRINT**. Since all of the commonly-used subroutines for supporting **BASIC** instructions are in this library, they do not need to be duplicated in other compiled programs on the disk. In most cases, using the runtime support module reduces the compiled program code size by up to 40 percent.

Unfortunately, though, Microsoft does not normally allow the **BASRUNG.EXE** module to be distributed with programs developed with the **BASIC** compiler. This means that if you write a program, compile it on the Microsoft compiler and sell it, you must pay Microsoft a royalty to use the runtime module.

Luckily, Microsoft offers a way of "integrating" the routines that are in the **BASRUNG.EXE** file into your compiled program. To specify this option, you use the **/O** compiler switch which tells the compiler to load all of the subroutines in **BASRUNG.EXE** that are used in your compiled program into the program at link time. While this makes the program much larger, the resulting program can be distributed and executed by itself without paying Microsoft royalties for the use of the runtime library.

If the **/O** option is used, be aware that the **CHAIN**, **COMMON** and **CLEAR** instructions are no longer supported by the compiler. This might mean that some programs need additional changes to work with the **/O** switch.

Once you have entered in the filenames and any compiler switches that you are going to use, the compiler proceeds to compile the program. During compiling, the compiler will report any errors that it finds on the screen along with the line the error was found on. If the error is designated as a warning error, the error can generally be ignored. If the error is severe, the problem should be dealt with and the

program recompiled before it is executed.

After compiling, the **.OBJ** file created by the compiler needs to be converted into an **.EXE** file before the program can be executed by DOS. To do this, type **LINK** followed by the name of the compiled program, a plus (+), and the names of any machine language programs that are to be used by the program. All names specified after **LINK** should not contain any extensions. For example, if you wanted to link the compiled **BASIC** program **TEST.OBJ** with the machine language subroutine library **SUBS.OBJ**, you would enter **LINK TEST+SUBS**. If no machine language subroutines are used by the **BASIC** program (horrible thought, isn't it), just type the program name (**LINK TEST**).

When you press **ENTER**, the linker asks you a set of questions. In most cases, you can ignore these questions and press **ENTER** for each one.

Once all the questions are answered, the linker utility merges the compiled program, the subroutine libraries in the **BASIC** compiler, and any machine language programs you use in the **BASIC** program into a single **.EXE** file. When the linking process is complete, the resulting program can be executed by entering the filename at the MS-DOS prompt.

That's all there is to compiling. I know it may seem like a lot at first, but once you do it a few times, it becomes quite easy. Just remember, all the extra work is worth it when you consider how much faster your programs will run.

### Compiling **DB11**

To "kill two birds with one stone" (so to speak), I will now describe how to compile the **DB11** database system presented in last month's Subroutine City. Hopefully, this will not only result in a compiled version of **DB11** but will also get you used to the compiling process.

First, the machine language access subroutine used in **DB11** needs to be assembled into an **.OBJ** file. Listing 4 contains the complete source for the new machine language access routine which should be entered with **EDLIN**, a word processor, or a text editor and assembled with *The Microsoft Macro Assembler*. The resulting **.OBJ** file from the assembler will be referred to as **BIOS.OBJ** for the rest of this article.

If you do not have an assembler, **BIOS.OBJ** is included with the **DB11** database system on PCM On Disk. If you have this disk, you can skip assem-

bling the program.

Next, enter **BASIC**, load the **MAIN.BAS** module of the database and delete lines 25, 50, 51, 52, 53205, 64000 and 65000. These deletes remove the code used to support loading and finding the machine language subroutine used by the interpreted **BASIC** version of **DB11**. In addition, lines 64000 and 65000 are deleted since they contain commands that are not supported by the compiler.

After the deletes have been performed, change Line 53210 to read:

```
53210 CALL BIOS(I,AX%,BX%,CX%,  
DX%,BP%,SI%,DI%,SW%):RETURN  
(Note: the '*' was removed after the  
word BIOS)
```

Change Line 53705 to read:

```
53705 V!=VARPTR(A$):A!=PEEK  
(V!+2)+PEEK(V!+3)*256:GOSUB  
53600:DX%=A%:RETURN  
(Note: the offsets inside the PEEK  
instructions were changed)
```

This last program change compensates for the extra byte used by compiler **BASIC** to store a string's variable descriptor.

After all of these changes have been made, save the program on disk using the command **SAVE "MAIN.BAS",A**. This will save the module on disk in ASCII format for the compiler.

Next, repeat the above steps for the rest of the modules in **DB11** (**DBFORM.BAS**, **DATAMAN.BAS** and **PRINT.BAS**).

Once all the **BASIC** programs have been modified and saved in ASCII format, exit to DOS by using the **SYS TEM** command and type **BASCOM** to load the **BASIC** compiler. The first question the compiler asks is for the source filename. For this, type **MAIN** (the **.BAS** extension is assumed), a space and **/X**. The **/X** option tells the compiler that all of the error handling capabilities of **GW-BASIC** are used by the program and that the extra code needed to support these routines must be included in the compiled program. After you press **ENTER** for the first prompt, you should press **ENTER** for the remaining two prompts since they should default to the values you want.

After all the questions have been answered, the compiler will compile the program, report that no errors occurred (hopefully), and return to DOS. If that is not what happens, look at the errors you received and make sure that the program was entered correctly.

Once at the MS-DOS prompt, repeat

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the compiling process for the remaining modules (DBFORM.BAS, DATAMAN.BAS and PRINT.BAS). When compiling PRINT.BAS, however, use both the /X and /S options instead of just the /X option. The /S is needed since PRINT.BAS is so large that it cannot be compiled in the computer's memory.

When compiling all these programs, you will probably run into problems with disk space since the compiler, the BASIC programs, and their compiled counterparts all tend to be quite large. If you are running on a one- or two-disk Tandy 1000, you will probably need to use at least two disks. To help relieve some of the disk usage, you can delete the .BAS source file for each module after it has been compiled.

Once all the programs have been compiled, you must link the compiled module and the machine language subroutine previously assembled into a single executable .EXE file. For the first DB11 module, type LINK MAIN+BIOS (LINK.EXE must be on the current disk), and press ENTER for all the questions. Like everything else, this process should be repeated for DBFORM.BAS, DATAMAN.BAS and PRINT.BAS.

After all of these steps have been taken, you should end up with MAIN.EXE, DBFORM.EXE, DATAMAN.EXE and PRINT.EXE on your disk. Also, before executing any of these modules, make sure that BASRUNG.EXE and the database's CDBASE.PTR file is on the current disk.

To run the database, type MAIN at the MS-DOS prompt and enjoy your new high speed database system.

#### The New Machine Language Access Subroutine

Throughout this article, I have made reference to a new machine language access routine. You are probably wondering, "what does the new machine language access subroutine do that the old one didn't?"

Actually the answer to that question is *nothing*. The new machine language subroutine is basically a duplicate of the original subroutine. The only difference between them is that the new one preserves the BP register and the new one can be compiled.

The BP register is saved for two reasons. First, while interpreted GW-BASIC does not usually mind if you destroy BP, it can, in some rare instances, hang up the computer. While the occasion is rare, I felt that adding the two bytes of code was worth the extra reliability. Also, since GW-BASIC requires that BP be saved, I added the

extra PUSH and POP to allow for compiler compatibility.

The other change in the machine language access subroutine is that the interrupt number used to access each MS-DOS function by the subroutine is no longer modified by BASIC. In the old version, a MID\$ instruction was used to modify the machine language subroutine to access the desired MS-DOS function interrupt. Unfortunately, since compiler BASIC does not support this kind of self-modifying code, I had to find another alternative.

The alternative I chose was to add the interrupt as another parameter to the CALL and to perform the program modification in machine language. While this may seem to be an easy solution, it actually isn't.

The problem comes in when the machine language program must modify itself. Since the code is supposed to be 100 percent relocatable, there is no way of knowing where the machine language subroutine is going to be loaded in memory. If you look at the source for the machine language access subroutine in Listing 4, you can see what I did to alleviate this problem. Basically, I had the machine language subroutine CALL a dummy subroutine inside of itself. The only function of this dummy subroutine was to return back to the instruction after the CALL. You are probably thinking that that is a useless subroutine. Actually, it is the key to the self-modifying code. When the CPU executes a CALL, it places the address of the instruction following the CALL on the stack. Then, when a RET is executed, the CPU jumps to the address on the stack and double increments the stack pointer. After the CALL/RET sequence has been executed, the address of the instruction after the CALL is still in the word just before the current stack pointer value. This address can then be used to find out where the program is in memory and thus allow the machine language subroutine to modify itself.

If you look at the code in Listing 4, you will see that I also disable interrupts before performing this operation. This is done to insure that an interrupt is not executed during the process, which would destroy the memory below the current stack pointer.

This method for finding the address of a machine language program in a relocatable environment is by far the smallest and easiest to use. If you are creating your own machine language programs for the compiler and need to perform self-modifying code, I would

suggest that you use this method.

#### Notes on Past Subroutine City Articles

To use this new machine language subroutine with the subroutines presented in the last few installments of Subroutine City (August 1985 through December 1985), enter the code in Listing 3 into the existing subroutine code.

If you wish to compile any of these subroutines, delete lines 20, 4010, 50000, 50001 and 50002. Also, remove the '!' in Line 40020 (like Line 53210 in DB11) and change Line 32010 to read:

```
32010 V!=VARPTR(A$):A!=PEEK(V!
+2)+PEEK(V!+3)*256:GOSUB 31000
:DX%=A%:RETURN
```

The assembled .OBJ file for Listing 4 needs to be linked to any machine language programs that use the machine language access subroutine.

One last note to any non-Tandy 2000 readers of this column. All of the subroutines presented last year in Subroutine City were designed to run on the Model 2000. Any of the subroutines that use any machine language, though, should run on any MS-DOS machine.

Unfortunately, any of the subroutines that use the keyboard require slight modifications for non-2000 machines since the Tandy 2000 returns different ASCII values for the arrow keys and other special control keys. Fortunately, the only programs that have problems with this are the demo programs that accompany the directory read subroutine and disk zap subroutines, and the full screen editor and advanced input subroutines presented in the first installment of Subroutine City.

A version of the full screen editor, the advanced input routine and another input routine that will run on all Tandy MS-DOS machines is given in the DB11.BAS module of DB11 presented in last month's Subroutine City. In addition, this subroutine package also includes quite a few very useful subroutines that work on any MS-DOS machine.

As for the directory read and disk zapper subroutines, their demo programs can be converted to run on a Tandy 1000, 1200 or 3000 by changing the ASCII values associated with each key command.

#### The Future of Subroutine City

From this article forward, all of the

programs presented in this column will be compatible with all Tandy MS-DOS systems. Since I now have a Tandy 3000, I will be able to check each program more thoroughly for differences between the 2000 and 1000, 1200 and 3000.

Also, all future subroutines will be checked for compatibility with the GW-BASIC compiler. This means that each month's subroutine will run "as is" with the compiler or will run with the changes specified in the article. This will

provide greater support for those using compiler BASIC on their systems.

Lastly, Subroutine City will continue to provide machine language subroutines for BASIC for at least the next three months. So far, I am planning ISAM subroutines and a high speed machine language sort subroutine for the next articles (I hope). I am also hoping to have another big program like *DB11* full of useful subroutines for the late summer or early fall issues of PCM.

If you have any subroutines or machine language programs that you need for your own application or would just like to see in this column, drop me a note and I will see what I can conjure up. Also, if you have any questions on any of Tandy's computers, drop me a note with a self-addressed, stamped envelope and I will try to answer your questions. □

### Listing 1:

#### Changes for all *DB11* modules

```
25 RESTORE 50:FOR X=1 TO 118:READ A:BIOS$=BIOS$+CHR$(A):NEXT:X!=FRE(BIOS$)
50  Program:biosd      Length: 118 bytes
51 DATA 85,139,236,250,232,110,0,139,118,254,251,139,94,22,139,31,46,136, 92,56,
139,94,6,255,55,157,139,94,8,139,63,139,94,10,139,55,139,94,14,139,23, 139,94,16
,139,15,139,94,20,139,7,139,94,18,139,31,139,110,12,139,110,0,205,33,85,83
52 DATA 139,236,139,94,10,156,143,7,139,94,12,137,63,139,94,14,137,55,139,94,18,
137, 23,139,94,20,137,15,139,94,24,137,7,91,139,110,22,137,94,0,139,110,16,91,13
7,94,0,93,202,18,0,195
52705 I=22:AX%=0:GOSUB 53200:DEF SEG:A=PEEK(VARPTR(AX%)):A$=CHR$(A):DEF SEG:SC=P
EEK(VARPTR(AX%)+1):RETURN
53205 XV=VARPTR(BIOS$):BIOS!-=PEEK(XV+1)+PEEK(XV+2)*256
53210 CALL BIOS!(I,AX%,BX%,CX%,DX%,BP%,SI%,DI%,SW%):RETURN
53705 V!=VARPTR(A$):DEF SEG:A!=PEEK(V!+1)+PEEK(V!+2)*256:GOSUB 53600: DX%-A%:RET
URN
54510 LOCATE 25,1,0:PRINT LEFT$(SP$,80);:RETURN
54615 COLOR FD,BD:RETURN
```

### Listing 2:

#### Individual module changes

##### Changes to MAIN.BAS

```
20 DIM UC(255),SN$(255),RD$(2,255),ST$(255),RE(255),QN(255)
22 DIM FSS$(1),TP$(8),FT$(1),J(4),RI$(2)
```

##### Changes to DBFORM.BAS

```
15 DIM PX(255),PY(255),SF(255),SS$(25),T(255),F$(255),L(255)
20 DIM UC(255),SN$(255),RD$(2,255),SL(255)
22 DIM RSS$(25),N$(255),FSS$(1),TP$(8),FT$(1),J(4),RI$(2)
3020 LOCATE 11,15:PRINT"Which drive contains the new database to select?";
7040 I$=""":XF=1:COLOR FH,BD:GOTO 7110
15010 IF ND THEN GOSUB 55700:GOTO 600
```

##### Changes to DATAMAN.BAS

```
15 DIM A$(255),B$(255),T(255),F$(255),L(255),X(255),SP(255)
20 DIM UC(255),SN$(255),RN$(255),RD$(2,255),ST$(255),RE(255),QN(255)
22 DIM N$(255),FS$(1),TP$(8),FT$(1),J(4),F2$(255),T2(255),L2(255),RI$(2)
3015 CLS:GOSUB 54300:PRINT TAB(25)"--- Organize database ---":GOSUB 54300:I$="""
7020 LOCATE 11,19:PRINT"Which drive contains the source database?";
50800 *** Read directory
50805 I=33:A$=LEFT$(SP$,43):GOSUB 53700:AX%=6656:GOSUB 53200
50810 AX%=19968:CX%=0:PN$=D$+"*.FLD"+NL$:SWAP PN$,A$:GOSUB 53700:SWAP PN$,A$:GO
SUB 53200:N=0:E=AX%:IF E>0 THEN RETURN
50815 N=N+1:X$=MID$(A$,31):N$(N)=LEFT$(X$,INSTR(X$,".")-1)
50820 AX%=20224:GOSUB 53200:E=AX%:IF E=18 THEN E=0:RETURN ELSE 50815
```

### Changes to PRINT.BAS

```
15 DIM A$(255),B$(255),T(255),F$(255),L(255)
5150 LOCATE 11,(80-LEN(OD$(X)))/2,0:PRINT OD$(X);:GOTO 5070
14932 XY=CVI(LEFT$(RD$(1,RF(XF)),2)):XM=ASC(MID$(RD$(1,RF(XF)),3,1)): XD=ASC(RIG
HT$(RD$(1,RF(XF)),1)):PRINT #4,USING FD$;RIGHT$(ZF$+MID$(STR$(XM),2),2); "-";RIG
HT$(ZF$+MID$(STR$(XD),2),2);"-";RIGHT$(ZF$+MID$(STR$(XY),2),4):GOTO 14950
DELETE 51100-51105
```

### Listing 3:

#### Changes to MS-DOS access subroutine

```
20 RESTORE 50000:FOR X=1 TO 118:READ A:BIOS$=BIOS$+CHR$(A):NEXT:X!=FRE(BIOS$)
40010 XV=VARPTR(BIOS$):BIOS!=PEEK(XV+1)+PEEK(XV+2)*256
40020 CALL BIOS!(I,AX%,BX%,CX%,DX%,BP%,SI%,DI%,SW%):RETURN
50000: Program:BIOS Length: 118 bytes
50001 DATA 85,139,236,250,232,110,0,139,118,254,251,139,94,22,139,31,46,136,92,5
6,139,94,6, 255,55,157,139,94,8,139,63,139,94,10,139,55,139,94,14,139,23,139,94,
16,139,15,139,94,20, 139,7,139,94,18,139,31,139,110,12,139,110,0,205,33,85,83
50002 DATA 139,236,139,94,10,156,143,7,139,94,12,137,63,139,94,14,137,55,139,94,
18,137, 23,139,94,20,137,15,139,94,24,137,7,91,139,110,22,137,94,0,139,110,16,91
,137,94,0,93,202,18,0,195
```

### Listing 4:

#### MS-DOS Access Subroutine Source Code

```
PAGE 60,132
TITLE MSDOS Function call Accesser ** By Robert D. Covington
CODE SEGMENT
ASSUME CS:CODE
PUBLIC BIOS
BIOS PROC FAR
PUSH BP ;Save BASIC's BP
MOV BP,SP ;Make BP base pointer of stack
;
; *** Self modifying code logic
;
CLI ;Disable interrupts
CALL DCALL ;Perform a CALL to find address
MOV SI,[BP-2] ;Get address of ML subroutine
STI ;Re-enable interrupts
MOV BX,[BP+22] ;Get selected interrupt number
MOV BX,[BX]
MOV CS:[SI+56],BL ;Modify code
;
; *** Variable to register transfer code
;
MOV BX,[BP+6] ;Get descriptor for SW variable
PUSH [BX] ;Move SW,[BX]
POPF
MOV BX,[BP+8] ;Get descriptor for DI variable
```

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```

MOV DI,[BX] ;Put variable in DI
MOV BX,[BP+10] ;Get descriptor for SI variable
MOV SI,[BX] ;Put variable in SI
MOV BX,[BP+14] ;Get descriptor for DX variable
MOV DX,[BX] ;Put variable in DX
MOV BX,[BP+16] ;Get descriptor for CX variable
MOV CX,[BX] ;Put variable in CX
MOV BX,[BP+20] ;Get descriptor for AX variable
MOV AX,[BX] ;Put variable in AX
MOV BX,[BP+18] ;Get descriptor for BX
MOV BX,[BX] ;Put variable in BX
MOV BP,[BP+12] ;Get descriptor for BP
MOV BP,[BP] ;Put variable in BP

; *** Execute MSDOS function

INT 21H ;Execute DOS function call

; *** Register to variable transfer code

PUSH BP ;Save BP for later
PUSH BX ;Save BX for later
MOV BP,SP ;Make BP base of stack
MOV BX,[BP+10] ;Get descriptor for SW variable
PUSHF ;MOV [BX],SW
POP [BX]
MOV BX,[BP+12] ;Get descriptor for DI variable
MOV [BX],DI ;Save DI in variable
MOV BX,[BP+14] ;Get descriptor for SI variable
MOV [BX],SI ;Save SI in variable
MOV BX,[BP+18] ;Get descriptor for DX variable
MOV [BX],DX ;Save DX in variable
MOV BX,[BP+20] ;Get descriptor for CX variable
MOV [BX],CX ;Save CX in variable
MOV BX,[BP+24] ;Get descriptor for AX variable
MOV [BX],AX ;Save AX in variable
POP BX ;Restore BX
MOV BP,[BP+22] ;Get descriptor for BX variable
MOV [BP],BX ;Save BX in variable
MOV BP,[BP+16] ;Get descriptor for BP variable
POP BX ;Put old BP in BX
MOV [BP],BX ;Save BP in variable
POP BP ;Restore BASIC's BP
RET 18 ;Return fixing for 9 parameters

DALL:
DB 0C3H ;Return Near
BIOS ENDP
CODE ENDS
END

```

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# BuddySystems

# What Are All Those Strange MS-DOS Commands, Anyway?

By William Barden, Jr.  
PCM Contributing Editor

Here you go, Mr. Barden," the postman said, handing me a stack of magazines, brochures, bills, free samples and envelopes. "This stuff was too big for your mailbox. If this keeps up, I'm afraid we'll have to ask you to cut down on your subscriptions to computer magazines," he grumbled.

"Yeah, sorry — maybe I'll just stick to PCM and RAINBOW and forget about *Computers and Electronics*, *Creative Computing* and *Popular Computing*," I smirked.

I carried the stack into the house and started paging through it. Humm . . . brochure from Computing Clearinghouse offering Timex 1000s for \$12.95 . . . latest copy of More Computer Supplies Catalog listing a 10 pack of diskettes on sale for only \$59.95 . . . ad from a company for fake Tandy 3000 labels to upgrade Tandy 1000s . . . ah, here's something interesting . . .

What I'd seen was advertising copy from a company called 1000 Clowns Software. According to the ad, their new *Utility Plus* package would enable

William Barden, Jr. is a master communicator in a field in which he is one of the few recognized experts — microcomputers. A prolific author of more than 27 books on computers and computer programming, Bill also has authored several instructional software projects for Tandy/Radio Shack.

a Tandy 1000 to do these things:

- Search all disk files for a given string of characters.
- Pull out all records from a file that contained three items.
- Record the date and time on listings or disk files.
- Provide an automatic copy of only those files not previously copied.
- Alphabetize directories.
- And many more (they said).

The interesting thing about this product was that every item in the list could already be accomplished in MS-DOS software on the Tandy 1000! Maybe you weren't aware that some of these things existed, or perhaps you had seen the MS-DOS commands, but just hadn't gotten around to using them. In this article, I'd like to show you the power of some of these commands and options, especially the power and versatility of batch files. I think you'll be able to find one or two that will really be a boon to some of your Tandy 1000, 1200, 2000 or 3000 operations.

## Adventures of a Different Sort

One of the neatest pieces of utility software on your Tandy 1000, 1200, 2000 or 3000 MS-DOS diskette is called *SORT.EXE*. We'll call it *SORT* for short. *SORT* is a "filter," meaning that it processes data that comes from a source such as keyboard or a disk file before

it goes on to a destination — the display or another file. *SORT* operates on any ASCII (text) file, sorting the records in the file in alphabetized order.

## BASIC Sorting

Suppose that you had generated a Radio Shack inventory file with a word processing program or BASIC that looked like the text in Example 1.

We've included a rule on the bottom to help you count the columns. Each line is a *record* of data consisting of three *fields*. The first field goes from Column 1 through 35 and is a description of the inventory item. The second field goes from Column 36 through 41 and is the retail price. The third goes from Column 42 through 52 and is the part number of the item.

To sort the records on the screen, you'd enter

```
A>sort < parts.txt
```

The results would be that in Example 2.

The sort program looked at the first column of each record and sorted the entire file before displaying the data on the screen. The MS-DOS command *SORT* told MS-DOS to search for the *SORT.EXE* program; MS-DOS assumes that the filespec extension would be *.EXE*, *.COM*, or a few other allowable extensions.

To sort the list in reverse, the /R option can be used:

```
A>sort /r <parts.txt
```

The results are shown in Example 3.

Another option that can be used is to specify the field for the sort. If you had wanted a list that was sorted by part number instead of description, you could have done this:

```
A>sort /+42 <parts.txt
```

The results are in Example 4.

#### Redirection

As nice as the sort is, though, it's made a lot more useful by the ability to *redirect* standard input and output of a command. Instead of output of a command result going to the screen, for example, you can specify that the output goes to a file.

Taking that last example, again, if you had said:

```
A>sort /+42 partsalp.txt
```

MS-DOS would have sent the alphabetized list to file PARTSALP.TXT rather than the screen. Listing the file with TYPE would then display the alphabetized list as before. The "greater-than" character (>) indicates that output is to go to the device after it, whether it's a file, line printer (PRN) or console screen (CON).

The less-than symbol (<) indicates that input to the sort filter comes from the PARTS.TXT file. The default for input is from the keyboard, which is not as often used. In the keyboard case, no less-than symbol is required (see Example 5).

The MS-DOS SORT command is very handy for general sorting of text data, in any field. It can also be used to do multiple-field sorting. For a long file, you could say something like the commands in Example 6, which would sort the file first by price, then by description, and then by part number. The final sort would be in file ZZZZZ3.

#### Directory Listings and the Sort

##### Piping

An obvious use for SORT is to use it on disk directories, which tend to be long, disorganized and confusing, especially when you have many diskettes or a hard disk.

This command,

```
A>dir | sort
```

for example, sorts the directory listing

of the current disk (A:) and displays it on the screen. The | symbol (vertical bar) indicates that the output of one command is not to a disk file, but to the *input* of another command. (Really, what we're talking about here when we mention commands is *programs*, as many commands are represented by separate MS-DOS program modules.) This redirection is called "piping."

#### More MS-DOS

The MS-DOS masses cried for more MS-DOS convenience and that's what they got. One of the conveniences is the MORE filter (MORE.COM on your disk).

It's difficult to read at the rates text is displayed on the screen, and the MORE command allows you to read only a screen full of text at a time. This command:

```
A>dir | sort | more
```

not only alphabetizes the directory listing, but displays it a screen-full at a time, like Example 7.

Pressing any key now displays the next page of the data on the screen. MORE is another handy filter to use any time you don't want a large volume of text whizzing by on the screen.

#### Example 1

```
A>type parts.txt
```

|                                  |       |         |
|----------------------------------|-------|---------|
| Vacuum tubes, assorted           | 19.95 | 23-6781 |
| Archer "Goodbuddy" 30-channel CB | 49.95 | 20-4567 |
| Book, "How to Use Your Model I"  | 4.95  | 26-7899 |
| Toy, Halloween II Meat Ax        | 3.95  | 19-6749 |

```
123456789I123456789I123456789I123456789I123456789I12
```

#### Example 2

|                                  |       |         |
|----------------------------------|-------|---------|
| Archer "Goodbuddy" 30-channel CB | 49.95 | 20-4567 |
| Book, "How to Use Your Model I"  | 4.95  | 26-7899 |
| Toy, Halloween II Meat Ax        | 3.95  | 19-6749 |
| Vacuum tubes, assorted           | 19.95 | 23-6781 |

#### Example 3

|                                  |       |         |
|----------------------------------|-------|---------|
| Vacuum tubes, assorted           | 19.95 | 23-6781 |
| Toy, Halloween II Meat Ax        | 3.95  | 19-6749 |
| Book, "How to Use Your Model I"  | 4.95  | 26-7899 |
| Archer "Goodbuddy" 30-channel CB | 49.95 | 20-4567 |

#### Example 4

|                                  |       |         |
|----------------------------------|-------|---------|
| Toy, Halloween II Meat Ax        | 3.95  | 19-6749 |
| Archer "Goodbuddy" 30-channel CB | 49.95 | 20-4567 |
| Vacuum tubes, assorted           | 19.95 | 23-6781 |
| Book, "How to Use Your Model I"  | 4.95  | 26-7899 |

#### Example 5

```
A>sort /+42
Archer "Goodbuddy" 30-channel CB 49.95
etc. 20-4567
```

#### Example 6

```
A>sort /+36 <parts.txt >zzzzz1
A>sort <zzzzz1 >zzzzz2
A>sort /+42 <zzzzz2 >zzzzz3
```

Note that in the above example, two piping symbols (|) were used to separate the MS-DOS commands. Multiple piping such as this can be done at any time.

### Another Fine Batch You've Gotten Us Into, Ollie!

MS-DOS is irritating in its litany of commands! Not only are there more than enough *ordinary* commands to keep track of, but there are the three dozen permutations of SORT and MORE and a lot of other functions we haven't yet discussed. There *is* a solution to using all of these diverse commands, however — it's called a *batch file*.

In case you're wondering about where the name "batch" comes from, let me give you a little background. In the very early days of computers ('40s and '50s), the room-sized computers operated on one program at a time, and users considered themselves lucky if they completed the 8-hour computing task before the system went south. Shortly after, however, computer use became more efficient. Computing jobs were run by feeding in punched cards that represented the program and by also entering *commands* via punched card, rather than manually. Multiple jobs — a FORTRAN program, followed by Bill of Materials, followed by a COBOL compilation — were submitted in "batches" of punched cards to make efficient use of an expensive computing resource. The batch capability of MS-DOS is an offshoot of this batch processing — a complete set of commands can be defined in a single file, this time in a disk file rather than in a batch of cards.

Batch files are collections of MS-DOS commands. All commands that are normally entered from the keyboard can be entered from a batch file. The file is an ASCII (text) file, so it can be produced by a word processor or by any other means of producing a text file. Batch files have the extension .BAT to tell MS-DOS that they can be executed; it's not necessary to specify the .BAT, though, when entering the batch filename to execute the commands.

A simple batch file to sort the directory and to use the MORE filter looks like Example 8.

Here, the batch file is called DIRSM.BAT and contains a "remark" line and the commands for the sort. To execute this batch file, producing the sort that we saw above, you'd simply enter:

```
A>dirsm
```

### Creating Batch Files From the Keyboard

The easiest way to produce short batch files is directly from keyboard to disk file by using the command

```
A>copy con: dirsm.bat
```

This uses the MS-DOS COPY command to copy lines from the keyboard (CON: stands for "console," another bit of historical computer jargon) to disk file DIRSM.BAT. (Here, the .BAT extension must be specified.)

After you've entered this command, the system will just sit there and stare at you, with a cursor on the line below the COPY. From that point, just enter the batch file lines, one at a time, ending each with ENTER. To end the file, press F6, or hold down the CTRL key and strike the Z key, and then press ENTER. (See Example 9.)

### REMARK and ECHO Commands

The batch REM command can be put into the batch file as often as necessary. It is displayed as the batch file is executed and can be used to prompt the user.

The ECHO command controls whether or not the batch commands are dis-

played. If an ECHO OFF is included in the batch file, all batch commands following the ECHO OFF will *not* be displayed. When an ECHO ON is executed, the display will restart. The exception to the ECHO OFF condition, though, is an ECHO command with a message included. Example 10 is a sample batch file for copying all BASIC files from Drive A to B.

Note here that while the command itself is not displayed when echo is off, the *output* from the command is displayed, as was the listing of files from the COPY command here. ECHO is somewhat neater than the REM as there is no A> prompts cluttering up the display. ECHO without following text will display the state of the ECHO, ON or OFF.

```
echo  
ECHO is on
```

### The PAUSE Command

The batch PAUSE command is self-explanatory. It's used after a message to the user so that he or she can take or confirm some action. Pressing any key except CTRL-C causes a continue of the batch action. (CTRL-C stops the batch action at any time.) PAUSE can also have a message after the PAUSE command.

#### Example 7

```
31 File(s) 58368 bytes free  
Directory of B:\  
Volume in drive B has no label  
%PIPE1  $$$  0  1-01-80  6:06a  
%PIPE2  $$$  0  1-01-80  6:06a  
ANSI    SYS  4399  10-20-84  1:00p  
.  
.  
KEYCNVT SYS  292  10-20-84  1:00p  
More ...
```

#### Example 8

```
A>type dirsm.bat  
rem This is a simple batch file  
dir | sort | more
```

#### Example 9

```
A>copy con: dirsm.bat  
rem This is a simple batch file <ENTER>  
dir | sort | more <ENTER>  
<F6> <ENTER>
```

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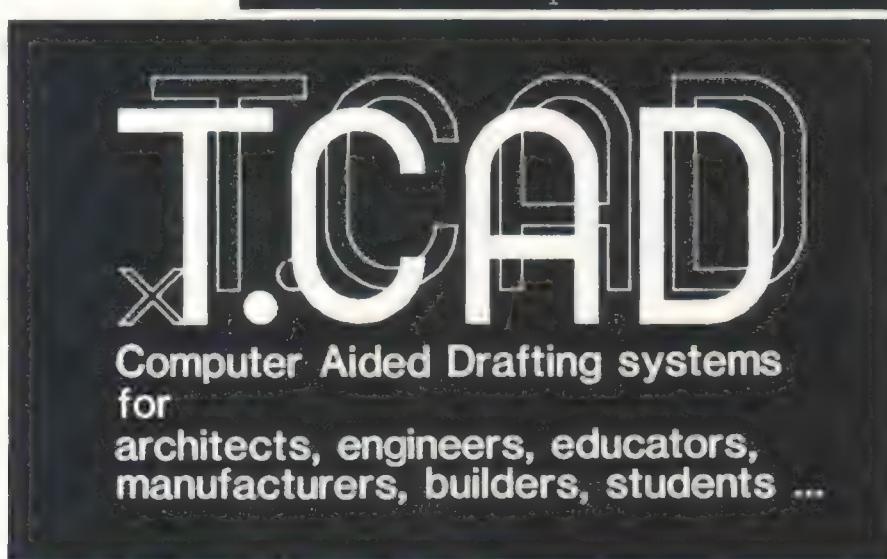
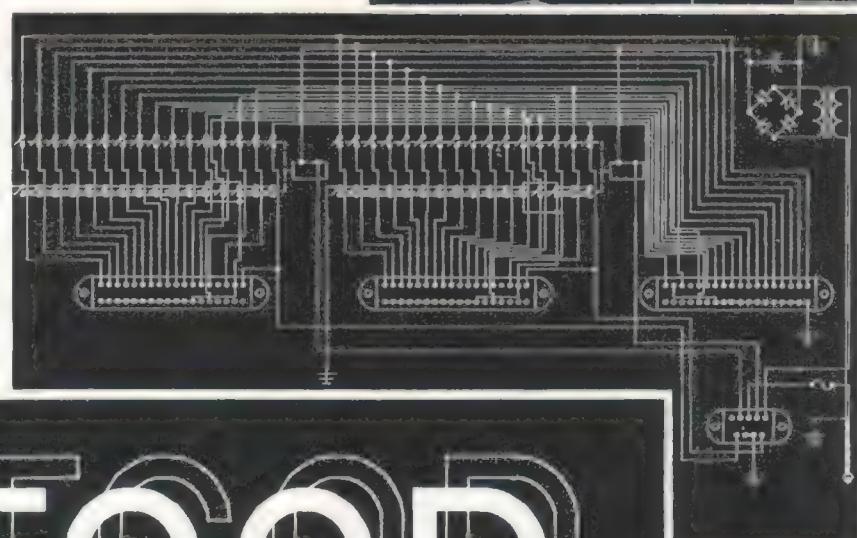
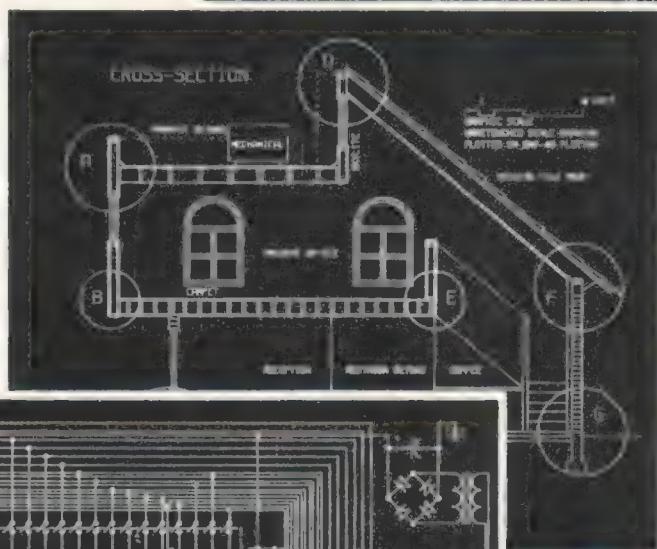
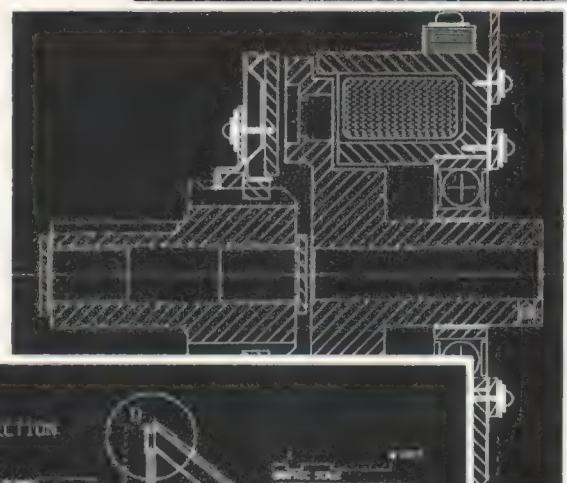
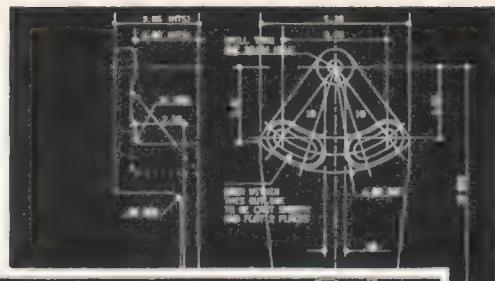
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## Batch Parameters

So far, we've discussed the following batch commands:

- **REM** — for remarks.
- **ECHO** — for turning display on and off and remarks.
- **PAUSE** — to temporarily suspend the batch operation for some manual intervention.

By themselves, these commands will allow you to construct a large number of predefined batch files that would guide a novice user in the proper sequence of steps (rem Put Disk marked "BOOKS1" in upper drive, etc...) or that you would find convenient simply because it's much easier to remember DIRSM than DIR | SORT /+5 | MORE. However, in addition to these batch commands, there are four more that come in handy. They are:

- **IF** — To test a condition.
- **GOTO** — To alter the path of the batch commands.
- **FOR** — To set up repeat of commands.
- **SHIFT** — To allow many command parameters.
- **SET** — To change command parameters.

In fact, these commands actually define a mini "programming language" that allows you to construct short, useful operating system programs. To understand how these four commands work, you need to know about *replaceable parameters*.

When a batch file is referenced by entering the name of a batch file, it's possible to include up to 10 *parameters* for use in the batch file. These parameters can be filespecs or simply text strings. They can't include embedded blanks, as blanks are used to separate (delimit) one parameter from the next. Example 11 is a typical set of parameters:

There are two parameters here, AT120985.PCM and AT111085.PCM. Within the batch file the parameters are referenced by the symbols %0, %1, %2, %3, %4, %5, %6, %7, %8 and %9, corresponding to the position in the line, with %0 always representing the batch filespec itself. In this example we'd have:

```
%0 = SWAP
%1 = AT120985.PCM
%2 = AT111085.PCM
%3 - %9 = nothing
```

Another example can be found in Example 12.

In other words, all MS-DOS does is to substitute the parameter for the "dummy" parameter of %0 through %9 in the guts of the batch file.

The example before this, SWAP.BAT, a batch file that would swap two filenames, would look like Example 13 in expanded form.

In this case MS-DOS substitutes PROG1.BAS every time it sees %1 and

PROG2.BAS every time it sees %2. The REN (rename) commands become

```
REN PROG1.BAS ZZZZZ1
REN PROG2.BAS PROG1.BAS
REN ZZZZZ1 PROG2.BAS
```

The ZZZZZ1 file, by the way, is simply a dummy file that is used for temporary storage.

## The IF Command

The batch IF command allows you to test one of the replaceable parameters

### Example 10

```
echo off
echo *****COPYB*****
echo Will copy all basic files from drive a: to b:
echo Put source diskette in drive a:, destination
echo diskette in drive b: and press any key.
pause
copy a:*.bas b:
echo on
rem All done
```

The output from this batch file will look like this:

```
*****COPYB*****
Will copy all basic files from drive a: to b:
Put source diskette in drive a:, destination
diskette in drive b: and press any key.
Strike a key when ready . . .
A:AT10281.BAS
A:AT10812.BAS
A:AT10283.BAS
3 File(s) copied

A>rem All done
A>
```

### Example 11

```
A>SWAP AT120985.PCM AT111085.PCM
```

### Example 12

```
echo off
echo This is a short batch file called %0.BAT
echo %9 %8 %7 %6 %5 %4 %3 %2 %1 %0
```

Executing this batch file by

```
A>TEST Now is the time for PROG1.BAS all good men
would display
```

```
A>echo off
This is a short batch file called TEST.BAT
men good all PROG1.BAS for time the is Now TEST
```

and then to alter the sequence of the batch file commands. Without an IF, batch files would consist only of a series of statements to be executed one after another, and that sequence would never change.

Both a string comparison and a file comparison can be made with IF. The file comparison is shown in the modification of SWAP in Example 14.

The first thing you'll notice after the IFs is that there are some strange looking names with colons in front of them. These names are IF/GOTO labels. After all, if you're going to alter the path of execution in the batch file, you must specify where the next batch command is, and the labels define those locations. Labels can be one to eight characters and are never displayed during batch file execution.

Either the GOTOS or IFs cause the path of execution to be altered. The IFs are similar to BASIC IF . . . THEN statements, while the GOTOS are similar to BASIC GOTOS.

The IF commands test to see whether a file EXISTS or does NOT EXIST. In this case we're trying to find an existing file that can be renamed, but also trying to check that no filename already exists with the new name to be given. Note that the filename is *after* the EXIST or NOT EXIST.

The EXIST and NOT EXIST conditions can be used often in batch files to check not only for user files specified in the parameters list, but also to see whether the program modules exist for the batch commands themselves. The commands in Example 15, for example, test whether SORT.EXE is available for a batch operation:

The second type of test that the IF statement can make is a test of equality or inequality of a string of text characters. Before looking at this, though, let's look at another MS-DOS filter, the FIND filter.

#### Finding Everything on Disk

The MS-DOS FIND command works through the FIND.EXE module. It searches a file for any string of characters. To find the character string "one Tandy 1000 equals ten PCJrs" in file AT101785.PCM, for example, you'd have the command and results in Example 16.

The string defined for the search must be exact — there is no compensation for the difference of upper- and lowercase characters. The string must be enclosed in double quotes.

There are several possible options in

#### Example 13

```
echo off
rem *****SWAP*****
rem Swaps the filenames of two files.
rem Do not use drive specifiers.
echo Swap %1 with %2? Press any key if yes, Ctrl,C if no
pause
ren %1 zzzzz1
ren %2 %1
ren zzzzz1 %2
echo File names swapped
echo on
```

A typical "call" would be

```
A>swap prog1.bas prog2.bas
```

and the output would look like this:

```
A>swap prog1.bas prog2.bas
```

```
echo off
Swap prog1.bas with prog2.bas? Press any key if yes, Ctrl,C if no
Strike a key when ready . . .
File names swapped
A>
```

#### Example 14

```
echo off
rem *****SWAP*****
rem Swaps the filenames of two files.
rem Do not use drive specifiers.
if exist %1 goto cont1
echo File %1 does not exist!
goto end
:cont1
if not exist %2 goto cont2
goto cont3
:cont2
echo File %2 does not exist!
goto end
:cont3
echo Swap %1 with %2? Press any key if yes, Ctrl,C if no
pause
ren %1 zzzzz1
ren %2 %1
ren zzzzz1 %2
echo File names swapped
:end
echo on
```

#### Example 15

```
if exist SORT.EXE goto cont1
echo You need the SORT.EXE module on your disk!
goto end
:cont1
```

this command. The /V option displays all lines that do *not* contain the string. The /C option does not display the lines, but only counts the number of occurrences of the string. The /N option displays the relative line number ahead of the line from the file.

The MS-DOS FIND command is probably even more useful than SORT, as it can be used to search directories for filenames or types of files or to search all disk files for a string, as we'll see.

To illustrate how powerful this can be when coupled with a batch file, look at Example 17. It finds all files on a disk containing a given string — even a hard disk organized with subdirectories:

This batch file is called by FINDFILE, followed by a drive specifier, followed by a string. The string might typically be .BAS, for all BASIC program files, or .SYS, for all system files.

```
>A findfile c: .BAS
```

for example, would display all files on a hard disk that were BASIC program files. MS-DOS would substitute the %2 parameter, in this example .BAS, into the FIND command to produce

```
find ".BAS" zzzzz1 | more
```

#### Back to the IF Command and String Comparisons

Listing 1 shows an interesting batch file that uses both the FIND command and IF string comparisons to search multiple fields in records. Suppose, for example you had records consisting of names and addresses as in Example 18.

You could use this batch file to find all Smiths that lived in Texas (TX), or to find a Smith living in Wisconsin on Oak Street. FINDMULT is called by the name, the filespec, and from one to three arguments, representing three FIND strings. If less than three arguments are used, a dash replaces the latter arguments. A typical call might be:

```
A>findmult maillist.txt Smith  
WI Oak
```

More about this next time, when we continue with batch files and some hints and tricks that will amaze and amuse your friends at Tandy 1000 user group meetings. Included in next month's column will be a batch file memo pad, a date/time recorder, and batch files that will enable you to organize and list all files on your floppy or hard disks. □

#### Example 16

```
A>FIND "one Tandy 1000 equals ten PCjrs" AT101785.PCM
```

FIND would search the AT101785.PCM for the string and display all lines containing the string:

```
----- AT101785.PCM  
one Tandy 1000 equals ten PCjrs". He actually said this:  
"I think one Tandy 1000 equals ten PCjrs or two PCs."
```

#### Example 17

```
echo off  
rem *****FINDFILE*****  
rem Finds all filenames containing a given string.  
rem Syntax: FINDFILE drive string  
tree %1 /f > zzzzz1  
find "%2" zzzzz1 | more
```

#### Example 18

|        |       |               |               |       |
|--------|-------|---------------|---------------|-------|
| Bunzel | David | 7856 71st St. | Fort Worth TX | 76105 |
| Smith  | John  | 414 Oak       | Wausau WI     | 53111 |
| .      | .     | .             | .             | .     |

and so forth, for hundreds of entries

#### The listing:

```
CLS  
echo off  
echo ***FINDMULT***  
rem Finds file lines in which there are several fields.  
rem Syntax: FINDMULT filespec string1 string2 string3  
rem Use dashes if no string  
if exist %1 goto next1  
echo File does not exist!  
goto done  
:next1  
find /n "%2" %1 > zzzzz1  
if %3 == - goto done  
find /n "%3" zzzzz1 > zzzzz2  
if %4 == - goto done  
find /n "%4" zzzzz2 > zzzzz3  
:done  
if %4 == - goto type2  
type zzzzz3  
goto endb  
:type2  
if %3 == - goto type1  
type zzzzz2  
goto endb  
:type1  
type zzzzz1  
:endb  
echo Done with FINDMULT  
echo on
```

# A Batch of New Ideas

By John B. Harrell, III

This month, I will look at two "problems" associated with the use of MENU.COM which were identified by several readers. The first problem involves depleting the MS-DOS program environment (more explanation later) and the second problem concerns the use of secondary menus.

I have been overwhelmed by the response to my *Menu* program. If you haven't received the demo disk yet and are still confused, the offer of sending me a prepaid disk and mailer is still valid.

As always, Murphy has done it again. I stated in the *Menu* articles that there was one limitation on using *Menu* but I really did not think that anyone would encounter it, and I did not elaborate on the subject. One of the very first replies to my demonstration disk was on this very topic and I now feel some further comments are required.

## Environmental Problems

One reader reported receiving an obscure error message — "Out of Environment Space" — which is not doc-

umented in the Tandy MS-DOS reference manual. He was attempting to use batch files linked to the *Menu* to set complex search paths prior to running his application.

When MS-DOS is first loaded, the "Basic Input/Output System" (BIOS) is retrieved from the disk by the "Boot ROM" and executed. The initialization phase of this code is responsible, among other things, for loading the MS-DOS system. Once MS-DOS is loaded, part of its initialization code is responsible for loading and executing the DOS command processor (COMMAND.COM).

The command processor constructs a programming "environment" table consisting of information such as its location and the current path. This area may be as large as 32K, however, it is usually limited to around 128 bytes. A pointer to this environment table is established for each program executed for the DOS command prompt.

This is where *Menu* and our limited space problem come into play. You may change any of the information in this copy of the environment table but you cannot extend its length beyond that established by COMMAND.COM prior to executing the program.

A program executed from the DOS prompt is generally known as the "parent process" and may execute other

programs generally called "child process." This is how *Menu* works. In writing the code for *Menu*, I made the decision to only pass the environment's pointer to the child process. This means you are working *on a copy* of the environment constructed by COMMAND.COM. This is an important concept to understand.

In plain English, this means you can do anything to the environment in the child process. All will be forgotten and returned *exactly* to the starting state when the child process terminates. Within bounds of the original environment, here's how we get around the limitation encountered by a few readers.

In my first article text, I provided a sample AUTOEXEC file that set a long path name and a long command prompt string. You can redefine this path name to whatever you desire in the batch file and it will automatically be reset when you exit back to the menu. Similarly, you can release the prompt string space by entering the DOS command PROMPT and pressing ENTER to return the prompt to the familiar A> and it will be restored when the child process is terminated.

The key point here is that I reserved space for these features of the system by installing them as the first commands executed by the system on startup. If

John B. Harrell, III has written for microcomputer magazines for three years. He holds a bachelor's degree in computer science and is a software technical expert for Navy electronic support measures systems.

you find you need more space than this normally reserves, set up a "dummy" environment variable with a string to reserve the space and release it in your batch files. The commands are:

```
SET DUMMY=01234567890123456789
0123456789ENTER
SET DUMMY=ENTER
```

This first sets an environment variable DUMMY to a string containing 30 characters. The second command totally releases this string space and removes the name DUMMY from the environment table, freeing up a total of 37 bytes of space (five for the name, one

for the equal sign (=), 30 for the string and one for the 00H terminator byte).

I think this will solve most of those problems but Murphy could strike twice. If you think this particular "brand of lightning" is leaking through your surge suppressor, write to me and provide the specifics of your problem. Send me a self-addressed, stamped envelope with your letter for the reply. I will gladly answer all requests concerning *Menu*'s operation.

#### Menus, Menus and More Menus

The second inquiry concerned using a second (or third) level of *Menu*. I really did not anticipate this in my

original program design. It is easy to completely fill a 10-megabyte hard disk while attempting to install 10 useful applications for *Menu*. My IBM-PC is continually on a "diet" to maintain approximately 10 to 15 percent free space on the disk.

Changing *Menu* (and MENUINST.BAS) to accommodate this will require some radical changes in a few areas. If you have not obtained the assembly source code, these changes will not be possible. If you have, follow the ensuing discussion and I will point out areas that require change.

First, you must add a new "permanent" menu option allowing a full

Figure 1

#### Two-Level Sub-Menu Batch Files

A.BAT

```
echo off
cls
echo
echo This is a test of the sub-menu options from a batch file
echo
echo Two options are currently available:
```

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```

echo
echo 1. Assigned task number 1
echo
echo 2. Assigned task number 2
echo
echo Answer the following question with a "Y" or an "N" for the
option
echo you choose to execute. Do you want to execute option 1:
yesno
if errorlevel 1 goto yanswer
nooption
:yanswer
yoption

NOPTION.BAT

echo off
cls
echo You have selected the "No" or second option on the sub-menu
echo previously displayed.
echo
pause

YOPTION.BAT

echo off
cls
echo You have selected the "Yes" or first option on the sub-menu
echo previously displayed.
echo
pause

```

terminate and exit from *Menu*. You can currently do this by using the CTRL-C or CTRL-BREAK combination (only if BREAK is enabled using the DOS command or the CONFIG.SYS command). This revision requires changing the text of the displayed menu options, changing the coding in the main program loop and changing the option display loop.

Second, you must make changes to the installation program to accommodate these new "permanent" options. This is really too hard; especially when you consider the memory costs for each level of menus. Each menu structure loaded requires a separate copy of MENU and COMMAND.COM. This requires about 24K for each menu level — not too much by today's standards, but it is significant and must be considered.

An easier solution would be to use limited batch files for these sub-menus and this is the crux of the second problem. In previous applications, these batch menus would display some text and exit to the DOS command level to await your entry. This entry would subsequently execute the correct batch file to carry out the task. This process was required because MS-DOS lacks a *very important feature*: the ability to ask for and receive user input during batch execution.

Figure 2 Three-Level Sub-Menu Batch Files

```

B.BAT

echo off
cls
echo
echo This is a test of the sub-menu options from a batch file
echo
echo Three options are currently available:
echo
echo 1. Assigned task number 1
echo
echo 2. Assigned task number 2
echo
echo 3. Assigned task number 3
echo
echo Answer the following menu option prompt with the appropriate
echo option number:
123opt
if errorlevel 3 goto 3opt
if errorlevel 2 goto 2opt
:1opt
1
:2opt
2
:3opt
3

1.BAT

echo off
cls
echo You have selected the first option on the sub-menu
echo previously displayed.
echo
pause

```

Attempting to end a batch file and wait for user input will not work if the batch file was executed from *Menu*. When I cause the appropriate menu option to be executed, I load a second version of COMMAND.COM to process the batch commands and then tell it what batch file to execute. In the parameters to COMMAND.COM, I have not specified that it must remain permanently resident, so it terminates and returns to *Menu* when the batch file is done.

Look at Figures 1 and 2. These are examples of a two-level sub-menu and a multiple-level (three) sub-menu. The two very short programs used in these batch files display an appropriate message, ask the user for a proper input, and post this result to the operating system as an error code return from a child process.

This error code can be examined by the batch procedure using the DOS IF command and the special condition — ERRORLEVEL. The command syntax is as follows:

**IF [NOT] condition command**

This means that the command will be executed if the condition is evaluated as "true." In my example, I compare the

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```
2.BAT
echo off
cls
echo You have selected the second option on the sub-menu
echo previously displayed.
echo
pause

3.BAT
echo off
cls
echo You have selected the third option on the sub-menu
echo previously displayed.
echo
pause
```

**Figure 3**  
**Creating YESNO.COM**

```
(22:16:01) B:\pcm> debug yesno.com
File not found; Disregard error message
-a100; Begin assembly at address 0100
XXXX:0100 mov ah,9; Set function call = display str
XXXX:0102 mov dx,11f; Set message address
XXXX:0105 int 21; Issue MS-DOS function request
XXXX:0107 mov ah,8; Set function = get keystroke
```

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DOS error code (ERRORLEVEL) to a known condition. DOS will execute the command (a GOTO command) if the error code is *greater than or equal to the specified value*. This last distinction is important and must be considered when writing batch files as this ultimately determines the order of the conditional statements.

You may nest the batch procedures to any level as long as the last command executed in a batch file is the name of the next batch file. In other words, you cannot return to the calling batch file. When the last batch command has been executed, COMMAND.COM will still terminate and return you to *Menu*.

Now, let's examine the two short programs contained in figures 3 and 4. These programs perform the simple task of displaying a prompt message, asking for your response, and returning a coded value to the operating system. This value is established as the value of the ERRORLEVEL condition that may be tested by the DOS commands.

Program YESNO allows the operator to respond with either a Y or N character signifying "yes" and "no" respectively. The "yes" response is coded with a return value of one and the "no" response has a value of zero. Enter the program exactly as listed in Figure 3 (ignoring the comments, of course) and save it to the disk.

The second program in Figure 4 is shorter but the logic is much more flexible and complex. This routine allows you to press a single digit key in response to the prompt. Currently, the limit is set allowing the values of one, two and three. This can easily be changed to include all 10 digits and, if you extend the logic somewhat, all key responses can be returned. The binary value of the key pressed is returned as the DOS error code.

## Conclusion

Well, that's it for another month. I hope this clears up a few problems in the use of *Menu* and makes it a more productive system for you. There is a wide application for simple programs like those presented in the sub-menus. Short extensions to the disk operating system are valuable and profitable tools.

I have really appreciated your response and comments on the DOS Boot column. Please feel free to let me know of any areas you desire to learn about. In addition to writing to me, I can also be reached on CompuServe by leaving mail to 73016,1326. □

```

XXXX:0109 int 21;Issue MS-DOS function request
XXXX:010B and al,df;Make sure character upper case
XXXX:010D mov ah,4c;Set function code for terminate
XXXX:010F cmp al,4e;Check for an 'N' - no
XXXX:0111 jz 11b;Yes - set return code and exit
XXXX:0113 cmp al,59;Check for a 'Y' - yes
XXXX:0115 jnz 107;No - loop until response good
XXXX:0117 mov al,1;Set return code
XXXX:0119 int 21;MS-DOS function for terminate
XXXX:011B mov al,0;... with the return code available
XXXX:011D int 21;... able for the parent process
XXXX:011F db '(Y/N)? $';String to display
XXXX:0127;Must have one extra return here
-rcx;Set the CX register to the
CX 0000;... proper value for writing
:27;... file to disk
-w;Issue file write
Writing 0027 bytes
-q;Exit DEBUG and return to DOS

(22:21:39) B:\pcm>

```

Note: Make sure that you type only the text that is underlined and end each line to DEBUG with pressing the ENTER key. Do not type the remarks at the end of each line (from the ':' to the end of line) as these are provided for your information and will cause errors with DEBUG.

Figure 4

## Creating 123OPT.COM

```

(22:25:01) B:\pcm> debug 123opt.com
File not found;Disregard error message
-a100;Begin assembly at address 0100
XXXX:0100 mov ah,9;MS-DOS Function = display string
XXXX:0102 mov dx,117;Message address offset
XXXX:0105 int 21;MS-DOS function request
XXXX:0107 mov ah,8;MS-DOS function = get keystroke
XXXX:0109 int 21;MS-DOS function request
XXXX:010B mov ah,4c;Set MS-DOS function for exit
XXXX:010D sub al,30;Remove ASCII character bias
XXXX:010F jle 107;Character is less than "1"
XXXX:0111 cmp al,3;Check for upper bound
XXXX:0113 jg 107;Greater - loop until char valid
XXXX:0115 int 21;MS-DOS return - code in AL reg
XXXX:0117 db 'Enter option: $';Message to display
XXXX:0126:Extra line to end DEBUG assembly
-rcx;Set byte count in the CX reg
CX 0000;... for writing the COM file
:26;... to disk
-w;Issue write command
Writing 0026 bytes
-q;Exit DEBUG and return to MS-DOS

(22:27:01) B:\pcm>

```

## Notes:

1. Make sure that you type only the text that is underlined and end each line to DEBUG by pressing the ENTER key. Do not type the remarks at the end of each line (from the ':' to the end of line) as these are provided for your information and will cause errors with DEBUG.
2. By changing the number in the instruction cmp al,3 at offset address 0111, you can make this respond to any number of options.

*This spreadsheet template helps make tax time a little easier*

# Form 1040 in a Spreadsheet

By Richard A. White  
PCM Contributing Editor

**T**ax time is upon us and they have not made things any simpler yet. If you and your spouse work, own a house, have medical and dental bills and other deductions, you are typical of many personal computer owners. If, like me, you have always done your own taxes, you might dread the more mechanical things such as making work sheets and checking and rechecking addition.

I found a number of years ago that a spreadsheet helps a lot. So here is one I used last year and which I have redone to run in *Lotus 1-2-3*. It is a full 1040 implementation complete with Schedules A, B and W. With minor syntax changes, it should work in any spreadsheet program that supports @IF, @ROUND and some version of LOOKUP. Unfortunately, it is much too much for *DeskMate*. *DeskMate* lacks the @IF command and cannot accommodate a spreadsheet this large.

As long as you enter your data properly, the spreadsheet will do nearly all the work including transferring results from the schedules to the proper lines in Form 1040 and calculating your Tax Table or Schedule X, Y or Z tax.

I won't discuss tax code details. If you need more help than that which comes with the forms, buy a copy of one of the tax preparation books on the newsstands. I have found the *H & R Block Income Tax Workbook* handy as much for the examples it provides as anything

else. By the way, the spreadsheet was verified using examples from the 1986 edition.

Since the spreadsheet is quite long, I must assume the reader is somewhat experienced with their spreadsheet and I will keep my comments to a minimum. So, let's start with the beginning of the 1040 form. This form and the schedules are essentially three-column affairs. The text is in Column A, while most of the numbers go into Column C. In some instances, entries are made in Column B and their results carried into Column C. See Figure 1.

I set Column A at 27 characters since I planned to condense the text. Columns B and C are the nine-column default. Since I am using a formula dump feature, I will widen these columns as needed to accommodate full formula lengths. Under "Filing Status," enter .1 in the B8...B12 cell that corresponds to your status when you enter your tax data. You must fill in only one of these for the program to work properly.

The exemptions section, shown in Figure 2, is a bit expanded over that in the 1040. It works much the same. Use Column A for text entries like dependent names and enter 1s as appropriate in Column B. The spreadsheet totals up the values for the right-hand blocks on the 1040 as well as using the total exemptions calculated automatically elsewhere in the spreadsheet. You do not need to manually transfer this value.

I have provided small work sheets within the income section, (Figure 3) where you can enter wages from different sources and have the program automatically total them. If you use Schedule B, the interest and dividend

---

*Richard White has a long background with microcomputers and specializes in BASIC programming. He has authored numerous programs and articles. His work has also appeared in PCM's sister publication, THE RAINBOW.*

Figure 1:

|                             | A                           | B     | C |
|-----------------------------|-----------------------------|-------|---|
| 1-                          | 1949 U.S. INCOME TAX RETURN | 1985  |   |
| 2-                          |                             |       |   |
| 3-                          | Name (& Spouse's name)      |       |   |
| 4-                          |                             |       |   |
| 5-                          |                             |       |   |
| 6-----                      |                             |       |   |
| 7-Filing Status (Enter #1)  | *****                       | ***** |   |
| 8- 1 Single                 | *****                       | ***** |   |
| 9- 2 Married- Joint Return  | *****                       | ***** |   |
| 10- 3 Married- Sep. Returns | *****                       | ***** |   |
| 11- 4 Head of household     | *****                       | ***** |   |
| 12- 5 Qualifying widow(er)  | *****                       | ***** |   |
| 13-----                     |                             |       |   |

Figure 2:

|   | A               | B     | C     |
|---|-----------------|-------|-------|
| 14-Exemptions (Enter #1 for each claimed) | *****           | ***** | ***** |
| 15- 6a Yourself                           | *****           | ***** | ***** |
| 16- 65 or older                           | *****           | ***** | ***** |
| 17- Blind                                 | @SUM(B15...B17) |       |       |
| 18- 6b Spouse                             | *****           | ***** | ***** |
| 19- 65 or older                           | *****           | ***** | ***** |
| 20- Blind                                 | @SUM(B18...B20) |       |       |
| 21- 6c Dependent children & names         | *****           | ***** | ***** |
| 22-                                       | *****           | ***** | ***** |
| 23-                                       | *****           | ***** | ***** |
| 24-                                       | *****           | ***** | ***** |
| 25-                                       | *****           | ***** | ***** |
| 26-                                       | *****           | ***** | ***** |
| 27-                                       | *****           | ***** | ***** |
| 28- 6d Dep. children living away          | *****           | ***** | ***** |
| 29-                                       | *****           | ***** | ***** |
| 30-                                       | B29+B30         |       |       |
| 31- 6e Other Dependents                   | *****           | ***** | ***** |
| 32-                                       | *****           | ***** | ***** |
| 33-                                       | *****           | ***** | ***** |
| 34-                                       | *****           | ***** | ***** |
| 35- 6f Total exemptions claimed           | @SUM(B31...B34) | ***** |       |
| 36-----                                   | @SUM(C17...C34) |       |       |

amounts are automatically transferred. If not, there is some space provided to list a few payers of each, as well as other income. Remember that text goes in Column A and amounts go in Column B. Column C results are calculated. Note the @IF( ) in C65 that checks that your dividend exclusion does not exceed your dividends. If it does, the formula enters a zero and not a negative number.

I should point out that the G152 in Cell B108 (Figure 4) is a formula that transfers the final result of the Schedule

W calculation. You will see other single-cell references like this. Just remember to precede them with a plus sign (+) when you type them so the spreadsheet knows that they are formulas.

In the tax computation section (Figure 5), your results from Schedule A, if you use it, are automatically transferred. If not, there are some contributions you may still enter in B118 and B119. Your number of exemptions is used to automatically calculate the total exemption in C123.

Your tax is reported in B125. If you

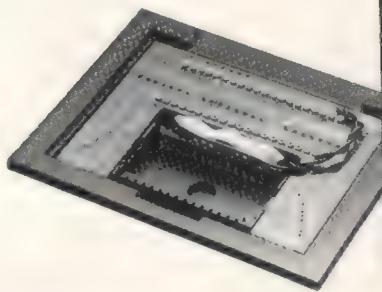
use a spreadsheet other than *Lotus 1-2-3* which does *not* automatically resolve all references, you will need to make at least three recalculations to assure that your tax is properly computed. It is best to manually recalculate until B125 stops changing. If you do income averaging, you will need to manually enter that tax in B126. The spreadsheet will use the lower of B125 and B126.

The credits section (Figure 6) is straightforward. The @IF( )'s in C140 and C145 are to assure that a negative tax does not result.

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This lets you use your ROM socket to snap-in other ROMS like LUCID spreadsheet, WRITE ROM text processor, or DISK + ROM file transfer program, and use them in any or all four banks. All of these, by the way, are available from PCSG.

When you are ready to copy a file from one bank to another or use any of the other fantastic functions we talked about you can just snap the RAM + ROM back into place.

Everybody that has this 128K system in their Model 100 is so excited, because it gives them four times the capacity and all banks work just like the Main Menu.

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Figure 3:

| A                                      | B     | C                      |
|--|-------|------------------------|
| 37-Income                              |       |                        |
| 38 List wages, salaries & tips         |       | *****                  |
| 39-                                    |       | *****                  |
| 40-                                    |       | *****                  |
| 41-                                    |       | *****                  |
| 42-                                    |       | *****                  |
| 43-                                    |       | *****                  |
| 44-                                    |       | *****                  |
| 45-                                    |       | *****                  |
| 46-                                    |       | *****                  |
| 47- 7 Wages, salaries & tips           | ***** | @SUM(B38..B47)         |
| 48-                                    | ***** | *****                  |
| 49- List interest income               | ***** | *****                  |
| 50- Schedule B if used                 | G107  | *****                  |
| 51-                                    |       | *****                  |
| 52-                                    |       | *****                  |
| 53-                                    |       | *****                  |
| 54-                                    |       | *****                  |
| 55- 8 Interest income                  | ***** | @SUM(B49..B55)         |
| 56-                                    | ***** | *****                  |
| 57- List dividend income               | ***** | *****                  |
| 58- Schedule B if used                 | G132  | *****                  |
| 59-                                    |       | *****                  |
| 60-                                    |       | *****                  |
| 61-                                    |       | *****                  |
| 62-                                    |       | *****                  |
| 63- 9a Dividends                       | ***** | @SUM(B57..B62)         |
| 64- 9b Exclusion                       |       | *****                  |
| 65- 9c Dividends less exclusion        |       | @IF(B63>B64,B63-B64,0) |
| 66-                                    | ***** | *****                  |
| 67- 10 Taxable state/local tax refunds |       | *****                  |
| 68- 11 Alimony received                | ***** | *****                  |
| 69- 12 Business income (loss) Sch. C   |       | *****                  |
| 70- 13 Capital gain (loss) Sch. D      |       | *****                  |
| 71-                                    | ***** | *****                  |
| 72- List capital gains distributions   |       | *****                  |
| 73- not shown on Line 13 above.        |       | *****                  |
| 74-                                    |       | *****                  |
| 75-                                    |       | *****                  |
| 76-                                    |       | *****                  |
| 77- 14 40% of above capital gains dist |       | *****                  |
| 78- 15 Supplimental gains (loss) F4797 |       | 4* @SUM(B73..B77)      |
| 79- 16 Taxable pensions, IRA, etc.     |       | *****                  |
| 80- 17a Other pensions etc.            |       | *****                  |
| 81- 17b Taxable amount                 | ***** | *****                  |
| 82- 18 Rent, royalties etc. Sch. E     |       | *****                  |
| 83- 19 Farm income (loss) Sch. F       |       | *****                  |
| 84- 20a Unemployment comp.             |       | *****                  |
| 85- 20b Taxable amount                 | ***** | *****                  |
| 86- 21a Social Security                |       | *****                  |
| 87- 21b Taxable amount                 | ***** | *****                  |
| 88- Tax exempt interest                |       | *****                  |
| 89-                                    | ***** | *****                  |

|         |                       |       |                 |
|---------|-----------------------|-------|-----------------|
| 90-     | List other income     | ***** | *****           |
| 91-     |                       | ***** | *****           |
| 92-     |                       | ***** | *****           |
| 93-     |                       | ***** | *****           |
| 94-     |                       | ***** | *****           |
| 95-     | 22 Other income total | ***** | @SUM(B90...B95) |
| 96-     |                       | ***** | @SUM(C47...C95) |
| 97----- |                       |       |                 |

Figure 4:

|                                    | A     | B     | C                |
|------------------------------------|-------|-------|------------------|
| 98-Adjustments to Income           | ***** | ***** | *****            |
| 99- 24 Moving expenses             |       | ***** | *****            |
| 100- 25 Employee Business exp.     |       | ***** | *****            |
| 101- 26 IRA deduction              |       | ***** | *****            |
| 102- 27 Keogh deduction            |       | ***** | *****            |
| 103- 28 Penalty early withdraw     |       | ***** | *****            |
| 104- 29 Alimony paid               |       | ***** | *****            |
| 105- Recipient name/S.S #          |       | ***** | *****            |
| 106-                               | ***** | ***** | *****            |
| 107-                               | ***** | ***** | *****            |
| 108- 30 Married deduct. Sch W G152 |       | ***** | *****            |
| 109- 31 Total adjustments          | ***** |       | @SUM(B98...B109) |
| 110-----                           |       |       |                  |
| 111-Adjusted Gross Income          | ***** | ***** | *****            |
| 112- 32 Adjusted gross income      | ***** |       | C96-C109         |
| 113-----                           |       |       |                  |

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Figure 5:

| A                                  | B         | C                 |
|------------------------------------|-----------|-------------------|
| 114-Tax Computation                | * * * * * | * * * * *         |
| 115- 33 Adjusted gross income      | * * * * * | C112              |
| 116- 34a Itemized deduction Sch. A |           | G85               |
| 117- If you do not itemize-        | * * * * * | * * * * *         |
| 118- 34b Cash contributions        | * * * * * | * * * * *         |
| 119- 34c Non-cash contributions    | * * * * * | * * * * *         |
| 120- 34d Total 34b and 34c         | B118+B119 | * * * * *         |
| 121- 34e Line 34d/2                | * * * * * | B120/2            |
| 122- 35 Income less deductions     | * * * * * | C112-C116-C121    |
| 123- 36 Total exemption            | * * * * * | C35*1040          |
| 124- 37 Taxable income             | * * * * * | C122-C123         |
| 125- Table/Schedule XYZ tax        | C194      | * * * * *         |
| 126- Schedule G tax                |           | * * * * *         |
| 127- 38 Table/Schedule tax         | * * * * * | @MIN(B125...B126) |
| 128- 39 Additional taxex           | * * * * * |                   |
| 129- Enter form number             |           | * * * * *         |
| 130- 40 Total precredit tax        | * * * * * | C127+C128         |
| 131-----                           |           |                   |

Figure 6:

| A                              | B         | C                          |
|--------------------------------|-----------|----------------------------|
| 132-Credits                    | * * * * * | * * * * *                  |
| 133- 41 Dependent care F2441   |           | * * * * *                  |
| 134- 42 Elderly/disabled care  |           | * * * * *                  |
| 135- Schedule R                | * * * *   | * * * * *                  |
| 136- 43 Residential Energy     |           | * * * * *                  |
| 137- Form 5695                 | * * * *   | * * * * *                  |
| 138- 44 Political Contrib.     |           | * * * * *                  |
| 139- 45 Personal credits       | * * * *   | @SUM(B133...B138)          |
| 140- 46 Tax less pers. credits | * * * *   | @IF(C139<C130,C130-C139,0) |
| 141- 47 Foreign tax Form 1116  |           | * * * * *                  |
| 142- 48 Gen business credit    |           | * * * * *                  |
| 143- List form number          |           | * * * * *                  |
| 144- 49 Total business/other   | * * * *   | C141+C142                  |
| 145- 50 Tax less all credits   | * * * *   | @IF(C140>C144,C140-C144,0) |
| 146-----                       |           |                            |

Figure 7:

| A                           | B         | C                 |
|-----------------------------|-----------|-------------------|
| 147-Other Taxes             | * * * * * | * * * * *         |
| 148- 51 Self-employment tax | Sch. SE   |                   |
| 149- 52 Alt. minimum tax    | Form 6251 |                   |
| 150- 53 Tax fm recap inv cr | Form 4255 |                   |
| 151- 54 SS tax on tips      | Form 4137 |                   |
| 152- 55 Tax on an IRA       | Form 5329 |                   |
| 153- 56 Total tax           | * * * *   | @SUM(C145...C152) |
| 154-----                    |           |                   |
| 155-Payments                | * * * * * | * * * * *         |
| 156- 57 Income tax withheld |           | * * * * *         |
| 157- 58 Estimated tax paid  |           | * * * * *         |
| 158- 59 Earned tax credit   |           | * * * * *         |
| 159- 60 Amt paid Form 4868  |           | * * * * *         |
| 160- 61 Excess SS/RRTA tax  |           | * * * * *         |
| 161- 62 Fuels tax credit    |           | * * * * *         |
| 162- Form 4136              |           | * * * * *         |
| 163- 63 Reg Inv Co credit   |           | * * * * *         |

|      |                                 |                                     |
|------|---------------------------------|-------------------------------------|
| 164- | Form 2439                       | *****                               |
| 165- | 64 Total payments               | * * * * @SUM(B156..B164)            |
| 166- |                                 |                                     |
| 167- | Refund or Amount You Owe        | * * * * *                           |
| 168- | 65 Amount OVERPAID              | * * * * @IF(C165>C153,C165-C153,C1) |
| 169- | 66 Amount to be REFUNDED TO YOU |                                     |
| 170- | 67 Apply to 1986 Tax            | C168-C169 * * * * *                 |
| 171- | 68 AMOUNT YOU OWE               | * * * * @IF(C153>C165,C153-C165,C1) |
| 172- |                                 |                                     |

The @IF( )'s in C168 and C171 (Figure 7) are setup to return either an entry in the "overpaid" category or in the "amount owed" category. If you overpaid, enter the refund desired in C169 and the amount to credit to 1986 taxes will be automatically calculated and shown in B170. This is backwards from the way we have entered data only into Column B and not Column C. But, the 1040 does it this way, so it should make filling the form out easier.

This completes Form 1040. We will start Schedule A at Cell E1. I like to make Column D a buffer and set it at 30 characters wide to assure that Schedule A is completely off the screen when working on the 1040 form. Make Column E27 to E30 characters and leave Columns F and G at nine-characters wide. See Figure 8.

Note that only medical expenses in excess of 5 percent of your adjusted income, C115, are deductible. So Form 1040 must be completed to that point for Schedule A to work correctly. This is only important in the final calculation and not while you are filling in data. But, I don't want you to get your hopes up if you enter your medical expenses before all your income is in and you think you will get a larger deduction than finally works out.

The amount listed in rows 56-60 (Figure 9) are not totalled. They are for information purposes only and should contain only contributions greater than \$3,000. You will probably have numerous smaller contributions. Make a separate worksheet to record and total these. In fact, you may need a number of separate worksheets. The H & R

Block Workbook has good examples of small worksheets that can be easily converted to spreadsheet templates.

See Figure 10. The tax tables and schedules have a standard deduction already built in. Your itemized deduction amount is what exceeds the standard deduction. When you entered a 1 in one of the B8..B12 cells, you told the template what your filing status was. The 1 was then multiplied by the appropriate standard deduction value in one of the H8..H12 cells. Since only one of the B8..B12 cells contains a number, only one of the H8..H12 cells will be evaluated. The formula @MAX(H8..H12) gets that number into G84. The @IF( ) in G85 compares itemized deductions with the standard deduction and returns the difference or zero.

Figure 8:

|     | E                           | F                   | G                      | H        |
|-----|-----------------------------|---------------------|------------------------|----------|
| 1-  | Schedule A                  | Itemized Deductions | 1985                   |          |
| 2-  |                             |                     |                        |          |
| 3-  |                             |                     |                        |          |
| 4-  | Medical and Dental Expenses | *****               | *****                  |          |
| 5-  | 1 Medicines and drugs       | *****               | *****                  |          |
| 6-  | 2a Doctors, dentists etc    | *****               | *****                  |          |
| 7-  | 2b Transportation/lodging   | *****               | *****                  |          |
| 8-  | List other                  | *****               | *****                  | 2390*B8  |
| 9-  |                             | *****               | *****                  | 3540*B9  |
| 10- |                             | *****               | *****                  | 1770*B10 |
| 11- |                             | *****               | *****                  | 2390*B11 |
| 12- |                             | *****               | *****                  | 3540*B12 |
| 13- |                             | *****               | *****                  |          |
| 14- |                             | *****               | *****                  |          |
| 15- |                             | *****               | *****                  |          |
| 16- | 2c Other total              | @SUM(F9..F15)       | *****                  |          |
| 17- | 3 Total Lines 1-2c          | F5+F6+F7+F16        | *****                  |          |
| 18- | 4 5% of line 33 Form 1040   | .05*C115            | *****                  |          |
| 19- | 5 Total medical & dental    | * * * * *           | @IF(F17>F18,F17-F18,0) |          |
| 20- |                             |                     |                        |          |

Figure 9:

|     | E                         | F     | G     |
|-----|---------------------------|-------|-------|
| 21- | Taxes You Paid            | ***** | ***** |
| 22- | 6 State & local income tx | ***** | ***** |

|     |                           |                               |
|-----|---------------------------|-------------------------------|
| 23- | 7 Real estate taxes       | * * * * *                     |
| 24- | 8a General sales taxes    | * * * * *                     |
| 25- | 8b Sales tax on motor veh | * * * * *                     |
| 26- | List other taxes          | * * * * *                     |
| 27- |                           | * * * * *                     |
| 28- |                           | * * * * *                     |
| 29- |                           | * * * * *                     |
| 30- |                           | * * * * *                     |
| 31- |                           | * * * * *                     |
| 32- | 9 Other taxes             | @SUM(F27...F31)               |
| 33- | 10 Total taxes            | * * * * * @SUM(F22...F25)+F32 |
| 34- |                           |                               |
| 35- | Interest You Paid         | * * * * *                     |
| 36- | 11a Mortgage int to inst  | * * * * *                     |
| 37- | 11b Mortgage int to indiv | * * * * *                     |
| 38- | List person paid int      | * * * * *                     |
| 39- |                           | * * * * *                     |
| 40- |                           | * * * * *                     |
| 41- | 12 Cr card/cg acct int    | * * * * *                     |
| 42- | List other interest       | * * * * *                     |
| 43- |                           | * * * * *                     |
| 44- |                           | * * * * *                     |
| 45- |                           | * * * * *                     |
| 46- |                           | * * * * *                     |
| 47- |                           | * * * * *                     |
| 48- |                           | * * * * *                     |
| 49- | 13 other interest         | @SUM(F43..F48)                |

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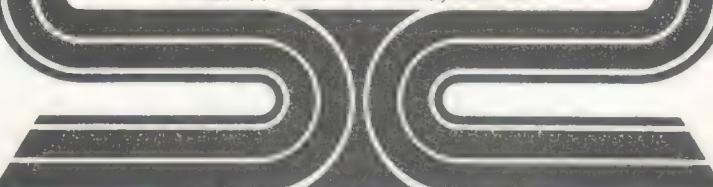
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|                            |                   |                                 |
|----------------------------|-------------------|---------------------------------|
| 50-                        | 14 Total interest | * * * * * * * * F36+F37+F41+F49 |
| 51-----                    |                   |                                 |
| 52-Contributions You Made  | * * * *           | * * * * * * * *                 |
| 53- 15a Cash cont <\$3000  |                   | * * * * * * * *                 |
| 54- 15b Cash cont >\$3000  |                   | * * * * * * * *                 |
| 55- List whom/how much     |                   | * * * * * * * *                 |
| 56-                        |                   | * * * * * * * *                 |
| 57-                        |                   | * * * * * * * *                 |
| 58-                        |                   | * * * * * * * *                 |
| 59-                        |                   | * * * * * * * *                 |
| 60-                        |                   | * * * * * * * *                 |
| 61- 16 other than cash     | * * * *           | * * * * * * * *                 |
| 62- 17 Carryover           | * * * *           | * * * * * * * *                 |
| 63- 18 Total contributions | * * * *           | F53+F54+F61+F6                  |
| 64-----                    |                   |                                 |

Figure 10:

|                                   | E                       |   | F |   | G                        |
|-----------------------------------|-------------------------|---|---|---|--------------------------|
| 65-                               | 19 Total casualty/theft | * | * | * | *                        |
| 66-                               | Attach Form 4684        | * | * | * | *                        |
| 67-----                           |                         | * | * | * | *                        |
| 68-Miscellaneous Deductions       | *                       | * | * | * | *                        |
| 69- 20 Union & Prof dues          | *                       | * | * | * | *                        |
| 70- 21 Tax return prep fee        | *                       | * | * | * | *                        |
| 71- List other                    | *                       | * | * | * | *                        |
| 72-                               |                         | * | * | * | *                        |
| 73-                               |                         | * | * | * | *                        |
| 74-                               |                         | * | * | * | *                        |
| 75-                               |                         | * | * | * | *                        |
| 76-                               |                         | * | * | * | *                        |
| 77-                               |                         | * | * | * | *                        |
| 78-                               |                         | * | * | * | *                        |
| 79- 22 Other deductions           | @SUM(F72...F78)         | * | * | * | *                        |
| 80- 23 Total Miscellaneous        | *                       | * | * | * | F69+F70+F79              |
| 81-----                           |                         | * | * | * | *                        |
| 82-Summary of Itemized Deductions | *                       | * | * | * | *                        |
| 83- 24 Total Lns 5,10,14,18,19,23 |                         |   |   |   | G19+G33+G50+G63+G65+G80  |
| 84- 25 Standard deduction         |                         |   |   |   | @MAX(H8...H12)           |
| 85- 26 Itemized deductions        |                         |   |   |   | @IF(G83>G84, G83-G84, 0) |
| 86-----                           |                         |   |   |   |                          |

Figure 11:

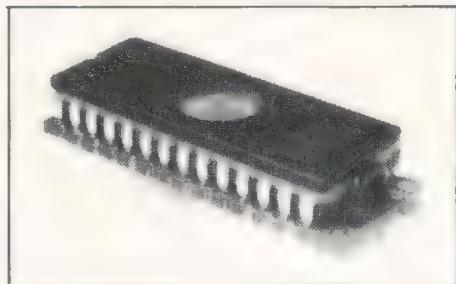
|   | E | F | G |
|---|---|---|---|
| 87-   |   |   |   |
| 88-Schedule B -- Interest & Dividend Income |   |   |   |
| 89-----                                     |   |   |   |
| 90-Part 1 Interest Income                   | * | * | * |
| 91- 1 Interest from mortgages               | * | * | * |
| 92- List payer                              | * | * | * |
| 93-   | * | * | * |
| 94- 2 List other interest                   | * | * | * |
| 95-   | * | * | * |
| 96-   | * | * | * |
| 97-   | * | * | * |
| 98-   | * | * | * |
| 99-   | * | * | * |

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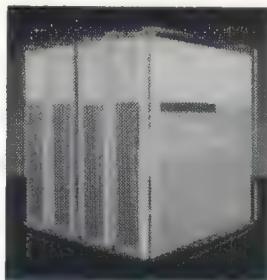
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| Turbo Pascal with BCD .....                 | \$109.90 | (NOT copy-protected) ..      | \$ 84.95  |
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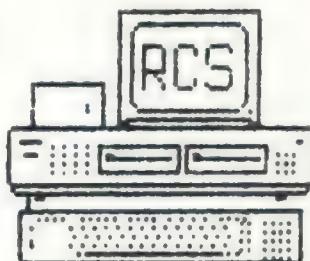
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|                       |  |                          |
|-----------------------|--|--------------------------|
| 100-                  |  | * * * *                  |
| 101-                  |  | * * * *                  |
| 102-                  |  | * * * *                  |
| 103-                  |  | * * * *                  |
| 104-                  |  | * * * *                  |
| 105-                  |  | * * * *                  |
| 106-                  |  | * * * *                  |
| 107- 3 Total Interest |  | * * * * @SUM(G91...G106) |
| 108-----              |  |                          |

|                                |                 |         |                     |
|--------------------------------|-----------------|---------|---------------------|
|                                | E               | F       | G                   |
| 109-Part II                    | Dividend Income | * * * * | * * * * * * * * * * |
| 110- 4 List dividend income    |                 | * * * * |                     |
| 111-                           |                 | * * * * |                     |
| 112-                           |                 | * * * * |                     |
| 113-                           |                 | * * * * |                     |
| 114-                           |                 | * * * * |                     |
| 115-                           |                 | * * * * |                     |
| 116-                           |                 | * * * * |                     |
| 117-                           |                 | * * * * |                     |
| 118-                           |                 | * * * * |                     |
| 119-                           |                 | * * * * |                     |
| 120-                           |                 | * * * * |                     |
| 121-                           |                 | * * * * |                     |
| 122-                           |                 | * * * * |                     |
| 123-                           |                 | * * * * |                     |
| 124-                           |                 | * * * * |                     |
| 125-----                       |                 | * * * * |                     |
| 126-----                       |                 | * * * * |                     |
| 127- 5 Total listed dividends  |                 | * * * * | @SUM(G110...G126)   |
| 128- 6 Capital gains dist.     |                 |         | * * * * * * * *     |
| 129- 7 Nontaxable distribution |                 |         | * * * * * * * *     |
| 130- 8 Public util. exclusion  |                 |         | * * * * * * * *     |
| 131- 9 Total exclusions        |                 | * * * * | @SUM(F128...F130)   |
| 132- 10 Net dividends          |                 | * * * * | G127-G131           |
| 133-----                       |                 |         |                     |

There is nothing fancy about Schedule B (Figure 11) except I blocked out Column F forcing values to be entered into Column G to conform to the IRS form.

Of course, inclusion of Schedules A, B and W (Figure 12) are optional. If you and your family or friends don't need them, don't bother typing them in. Figure 13 shows the tax lookup tables which should be placed in the exact cells shown so that the tax calculation formulas will work.

The tax schedule values came from the 1986 *H & R Block Workbook*. I have to assume that they are correct at this writing. You might check the values for the schedule and range you will be using against the schedule in the IRS booklet you got with your 1040.

Now we come to the hard work, typing in the tax calculation formulas exactly as they appear in Figure 14. By

the way, if you know that you will only be filing a married joint return, for example, you can cut your work by only typing the lookup table and the calculation formulas that apply. Be sure to type these exactly where shown in the spreadsheet and you should have no trouble.

The IRS expects those whose taxable income is less than \$50,000 to look up their tax in the tax tables. Since the IRS computers check to make sure this is done accurately, our spreadsheet must calculate the same value as the tax table provides. For income over \$3,000, the tables are set up in \$50 ranges and the tax is that on the central value in the range. For example, the tax table value for \$11,035 is actually the tax on 11025. The formulas in cells A173...A177 determine the taxable income for tax table lookup.

For income below \$3,000, the tables

are set up in \$25 increments so we need different formulas in cells B173...B177 to calculate a correct income in this range. The formula in cell B175 is incomplete above and should be:

```
@IF(B174<25,12.5,@IF(B174<50,
37.5,@IF(B174<75,62.5,87.5))))
```

The @IF( ) in C177 chooses which taxable income value to use. If taxable income is over \$50,000, the taxable income from C174 is used directly. Three @VLOOKUP( ) formulas get the right values from the lookup tables. The calculations are done within the @ROUND( ) formulas which return an integer tax value.

You should be able to type in the template and debug it in a few evenings. And once you have it working, try your hand at the 1040A and some others you might need to use. □

Figure 12:

|   | E         | F                 | G     |
|---|-----------|-------------------|-------|
| 134-Schedule W                                    |           |                   |       |
| 135-Deduction for a Married Couple When Both Work |           |                   |       |
| 136-----  |           |                   |       |
| 137-Step 1 Your earned income                     | (a) You   | (b) Spouse        |       |
| 138-----  |           |                   |       |
| 139- 1 Wages etc F1040 Ln 7                       |           |                   |       |
| 140- 2 Other earned income                        |           |                   |       |
| 141- 3 Total earned income                        | F139+F140 | G139+G140         |       |
| 142-----  | *****     | *****             |       |
| 143-Step 2 Qualified earned income                |           |                   | ***** |
| 144-----  |           |                   |       |
| 145- 4 Lns 25,26,27,31 adjust                     |           |                   |       |
| 146- 5 Qualified earned income F141-F145          |           | G141-G145         |       |
| 147-----  | *****     | *****             |       |
| 148-Step 3 Figure Your Deduction                  |           |                   |       |
| 149-----  |           |                   |       |
| 150- 6 Smaller of 5a or 5b                        | *****     | @MIN(F146...G146) |       |
| 151- 7 Percentage to figure deduction             |           |                   | 10    |
| 152- 8 Deduction                                  |           | .1*G150           |       |
| 153-----  |           |                   |       |

Figure 13:

|                               | E           | F    | G        | H          |
|-------------------------------|-------------|------|----------|------------|
| 154-Income Tax lookup tables  |             |      |          | Schedule X |
| 155-Schedule X Taxable Income |             | Rate | Precalc  | Amt over   |
| 156-----                      | .00         | .00  | .00      | .00        |
| 157-----                      | 2390.00     | .11  | .00      | 2390.00    |
| 158-----                      | 3540.00     | .12  | 126.50   | 3540.00    |
| 159-----                      | 4580.00     | .14  | 251.30   | 4580.00    |
| 160-----                      | 6760.00     | .15  | 556.50   | 6760.00    |
| 161-----                      | 8850.00     | .16  | 870.00   | 8850.00    |
| 162-----                      | 11240.00    | .18  | 1252.40  | 11240.00   |
| 163-----                      | 13430.00    | .20  | 1646.60  | 13430.00   |
| 164-----                      | 15610.00    | .23  | 2082.60  | 15610.00   |
| 165-----                      | 18940.00    | .26  | 2848.50  | 18940.00   |
| 166-----                      | 24460.00    | .30  | 4283.70  | 24460.00   |
| 167-----                      | 29970.00    | .34  | 5936.70  | 29970.00   |
| 168-----                      | 35490.00    | .38  | 7813.50  | 35490.00   |
| 169-----                      | 43190.00    | .42  | 10739.50 | 43190.00   |
| 170-----                      | 57550.00    | .48  | 16770.70 | 57550.00   |
| 171-----                      | 85130.00    | .50  | 30000.10 | 85130.00   |
| 172-----                      | 99999999.00 |      |          |            |
| 173-----                      |             |      |          |            |
| 174-----                      |             |      |          | Schedule Z |
| 175-Schedule Z Taxable Income |             | Rate | Precalc  | Amt over   |
| 176-----                      | .00         | .00  | .00      | .00        |
| 177-----                      | 2390.00     | .11  | .00      | 2390.00    |
| 178-----                      | 4580.00     | .12  | 240.90   | 4580.00    |
| 179-----                      | 6760.00     | .14  | 502.50   | 6760.00    |
| 180-----                      | 9950.00     | .17  | 823.10   | 9950.00    |
| 181-----                      | 12280.00    | .18  | 1372.20  | 12280.00   |
| 182-----                      | 15610.00    | .20  | 1971.60  | 15610.00   |
| 183-----                      | 18940.00    | .24  | 2637.60  | 18940.00   |
| 184-----                      | 24460.00    | .28  | 3962.40  | 24460.00   |
| 185-----                      | 29970.00    | .32  | 5545.20  | 29970.00   |
| 186-----                      | 35490.00    | .35  | 7271.60  | 35490.00   |
| 187-----                      | 46520.00    | .42  | 11132.10 | 46520.00   |
| 188-----                      | 63070.00    | .45  | 18083.10 | 63070.00   |

|                               |             |            |          |           |
|-------------------------------|-------------|------------|----------|-----------|
| 189-                          | 85130.00    | 9.48       | 28019.10 | 85130.00  |
| 190-                          | 112720.00   | 9.50       | 41253.30 | 112720.00 |
| 191-                          | 99999999.00 |            |          |           |
| 192-----                      |             |            |          |           |
| 193-Married Joint Returns:    |             | Schedule Y |          |           |
| 194-Schedule Y Taxable Income | Rate        | Precalc    | Amt over |           |
| 195-                          | 0.00        | 0.00       | 0.00     | 0.00      |
| 196-                          | 3540.00     | 0.11       | 0.00     | 3540.00   |
| 197-                          | 5720.00     | 0.12       | 239.80   | 5720.00   |
| 198-                          | 7910.00     | 0.14       | 502.60   | 7910.00   |
| 199-                          | 12390.00    | 0.16       | 1129.80  | 12390.00  |
| 200-                          | 16650.00    | 0.18       | 1811.40  | 16650.00  |
| 201-                          | 21020.00    | 0.22       | 2598.00  | 21020.00  |
| 202-                          | 25600.00    | 0.25       | 3695.60  | 25600.00  |
| 203-                          | 31120.00    | 0.28       | 4985.60  | 31120.00  |
| 204-                          | 36630.00    | 0.33       | 6528.40  | 36630.00  |
| 205-                          | 47670.00    | 0.38       | 10171.60 | 47670.00  |
| 206-                          | 62450.00    | 0.42       | 15788.00 | 62450.00  |
| 207-                          | 89090.00    | 0.45       | 26976.80 | 89090.00  |
| 208-                          | 113860.00   | 0.49       | 38123.30 | 113860.00 |
| 209-                          | 169920.00   | 0.50       | 65151.70 | 169920.00 |
| 210-                          | 99999999.00 |            |          |           |
| 211-----                      |             |            |          |           |
| 212-Married Separate Returns: |             |            |          |           |
| 213-Schedule Y Taxable Income | Rate        | Precalc    | Amt over |           |
| 214-                          | 0.00        | 0.00       | 0.00     | 0.00      |
| 215-                          | 1770.00     | 0.11       | 0.00     | 1770.00   |
| 216-                          | 2860.00     | 0.12       | 119.90   | 2860.00   |
| 217-                          | 3955.00     | 0.14       | 251.30   | 3955.00   |
| 218-                          | 6195.00     | 0.16       | 564.90   | 6195.00   |
| 219-                          | 8325.00     | 0.18       | 995.70   | 8325.00   |
| 220-                          | 10510.00    | 0.22       | 1299.00  | 10510.00  |
| 221-                          | 12800.00    | 0.25       | 1802.80  | 12800.00  |
| 222-                          | 15560.00    | 0.28       | 2492.80  | 15560.00  |
| 223-                          | 18315.00    | 0.33       | 3264.20  | 18315.00  |
| 224-                          | 23835.00    | 0.38       | 5085.80  | 23835.00  |
| 225-                          | 31225.00    | 0.42       | 7894.00  | 31225.00  |
| 226-                          | 44545.00    | 0.45       | 13488.40 | 44545.00  |
| 227-                          | 56930.00    | 0.49       | 19061.65 | 56930.00  |
| 228-                          | 84510.00    | 0.50       | 32575.85 | 84510.00  |
| 229-                          | 99999999.00 |            |          |           |

Figure 14:

|                       |                          |    |                                  |    |                           |   |
|-----------------------|--------------------------|----|----------------------------------|----|---------------------------|---|
| [                     | A                        | ][ | B                                | ][ | C                         | ] |
| 173-                  | 100*@INT(C124/100)       |    | 100*@INT(C124/100)               |    |                           |   |
| 174-                  | C124-A173                |    | C124-B173                        |    |                           |   |
| 175-                  | @IF(A174<50,25,75        |    | @IF(B174<25,12.5,@IF(B174<50,37, |    |                           |   |
| 176-                  | A173+A175                |    | B173+B175                        |    |                           |   |
| 177-                  | @IF(C124<50000,A176,C124 |    | @IF(C124<50000,B176,C124)        |    | @IF(C124<30000,B177,A177) |   |
| 178-Filing status 1   | Precalc                  |    | @VLOOKUP(C177,E156..E172,2)      |    |                           |   |
| 179-                  | Amount over              |    | @VLOOKUP(C177,E156..E172,3)      |    |                           |   |
| 180-                  | Rate                     |    | @VLOOKUP(C177,E156..E172,1)      |    |                           |   |
| 181-                  | Tax                      |    | @ROUND(B180*(C177-B179)+B178,0)  |    | @IF(B8>0,B181,0)          |   |
| 182-Filing status 4   | Precalc                  |    | @VLOOKUP(C177,E176..E191,2)      |    |                           |   |
| 183-                  |                          |    | @VLOOKUP(C177,E176..E191,3)      |    |                           |   |
| 184-                  |                          |    | @VLOOKUP(C177,E176..E191,1)      |    |                           |   |
| 185-                  |                          |    | @ROUND(B184*(C177-B183)+B182,0)  |    | @IF(B11>0,B185,0)         |   |
| 186-Filing status 2&5 | Precalc                  |    | @VLOOKUP(C177,E195..E210,2)      |    |                           |   |
| 187-Joint Returns     | Amount over              |    | @VLOOKUP(C177,E195..E210,3)      |    |                           |   |
| 188-                  | Rate                     |    | @VLOOKUP(C177,E195..E210,1)      |    |                           |   |
| 189-                  | Tax                      |    | @ROUND(B188*(C177-B187)+B186,0)  |    | @IF((B9+B12)>0,B189,0)    |   |
| 190-Filing status 3   | Precalc                  |    | @VLOOKUP(C177,E214..E229,2)      |    |                           |   |
| 191-Separate Returns  | Amount over              |    | @VLOOKUP(C177,E214..E229,3)      |    |                           |   |
| 192-                  |                          |    | @VLOOKUP(C177,E214..E229,1)      |    |                           |   |
| 193-                  |                          |    | @ROUND(B192*(C177-B191)+B190,0)  |    | @IF(B10>0,B193,0)         |   |
| 194-                  |                          |    |                                  |    | @SUM(C181..C193)          |   |

# A Text Analyzer For The Model 100/200

By Ronald F. Balonis

**T**he Model 100 is called a "portable computer." That's probably why you bought it. But its real worth, as most find, is in what it lets you do with your words rather than your numbers. Everyone must write. And, no matter what your writing proficiency or needs, writing on a 100 is the best way yet to make the most of what you do.

#### Writing Better with the Text Editor

It's a fact of life in computing: Computers make you write. To make them go, you must write programs for them. And now, you can also use them to write for people. They're both called writing, but that's where the similarity ends. Writing for a computer is easier; its words and syntax have only one meaning, and when it doesn't understand, it tells you so. When writing for people, you never really know; there's seldom any useful feedback. That's where a little word processing such as the 100's text editor helps. It helps you find and fix errors of spelling and syntax; to find and fix errors of meaning; to revise and edit until it says what you mean; to make your writing readable and understandable.

Everyone can acquire the skills of writing. You get the spelling and meaning from dictionaries, the grammar and syntax from text books, the skill in their use from practice, practice, and more practice. Somehow though, the computerist in me thinks there must be an easier way. There needs to be a program to compute the statistics of *readability* of your work.

#### Computing Readability

Readability schemes abound in the academic world. Three of the readability disciples whose work made my text analyzer, TSTATS.BA, program possible are Dr. Edward Fry, Robert Gunning and Dr. Rudolf Flesch. Their readability methods count the words and the syllables, find the average length of the sentences and the number of sentences and syllables per hundred words, then use them to compute a level of education for the text. However, the methods do not account for context, content, or style, so the implied precision is imprecise at best. They should be used as a guide, rather than a panacea, to better writing —

---

*Ronald F. Balonis is chief engineer of radio station WILK in Wilkes-Barre, Pennsylvania. He has been an electronics and computer hobbyist for many years and, since March 1983, a Model 100 enthusiast.*

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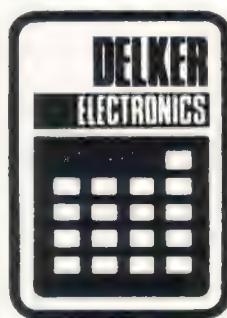


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like a dictionary, a thesaurus or a book on grammar.

With Dr. Edward Fry's readability method, you count the number of sentences and syllables per hundred words. Then plot the numbers on his readability graph to find the grade (education) level of the text.

Robert Gunning computes his Fog Index, which relates to the education level of the text, by counting the number of sentences and polysyllables per hundred words. Add the two numbers together, and then multiply by 0.4 to get the Fog Index.

Dr. Rudolf Flesch's method computes a reading ease score; he also has a similar method to compute a human interest score by counting the number of personal references in the sentences. As in the other methods, you count the words and syllables per hundred words; then, to compute the reading ease score, multiply the number of sentences per hundred words by 1.015; multiply the number of syllables per hundred words by 0.846; add them together and subtract from 206.835 to get the reading ease score — a number between zero (unreadable) and 100 (very easy).

Readability has been a concern of many for many years. The object of writing or reading is clear communication, all too often not achieved. Over the years, there have been many researchers who have worked on readability. You can find out much more about readability and them at your local library. Find Dr. Fry's readability graph in the December 1977 issue of *The Journal of Reading*. Find Robert Gunning's Fog Index in his book *Techniques of Clear Writing*. And, find Dr. Flesch's readability score in his book *The Art of Readable Writing*.

The consensus of thought indicates that sentences and syllables per hundred words correlate to readability; only the method of defining what they mean varies. But these are not the only factors that can affect readability and understanding; there are many more, subjective ones, that are difficult to measure, even to define. Fortunately, these objective factors lend themselves to computerization: The task of counting sentences is easy; the grammar is rather exact. Counting of syllables, while not as exact because of the spelling and sound variability in our words, is also easy for a computer.

## The Text Analyzer Program

TSTATS.BA counts the words and syllables, then displays these statistics of the text:

- Number of characters, words, sentences, punctuation marks and syllables
- Average lengths of words, sentences and punctuations
- Number per hundred of sentences, punctuation marks and syllables
- The number of and the distribution of words with one to five syllables
- The Fog Index and the reading ease score
- To find the readability according to Dr. Fry, plot the number of sentences and syllables per hundred words on his readability graph.

Resident text files and a built-in text editor make text analysis an easy task for the 100. The program has only to read the file, a character/word at a time and let it fall through the algorithm. The algorithm defines a syllable as

a group of characters including at least one vowel bounded by a space or consonant; a word as a group of characters bounded by a leading space and a trailing space or punctuation mark; and a sentence as a group of words followed by the punctuation mark and a space. The program loops on it and totals the characters, syllables, words and sentences in the the text file; then displays the text's statistics.

#### Program Description

TSTATS.BA consists of four sections: initializations, lines 0 to 85; directory sign on and file selection prompts in lines 100 to 190; syllable, word and sentence counting in lines 195 to 500; and statistics display in lines 1000 to 1520.

In the initializations section, the program dimensions the syllable distribution array SB(10) and the directory filename array DIR\$(20). The section defines the strings of the program and constructs, in lines 40 through 50, a machine language program for an INKEY\$ function with a cursor.

In the directory sign on section, lines 110 to 145 form the directory display routine. By using POKE commands, the RAM directory is defined in DIR\$ and then the INSTR function searches it for all of the .DD files. Lines 160 to 185 form the file selection prompt routine which calls the INKEY\$ program in ML\$. Press the cursor keys and ENTER to select the text file to analyze.

In the syllable, word and sentence section, the function of the variables are: A\$, the input character or the end character of a word; B\$, a word; S, a syllable flag (it insures that two vowels in sequence count only as one syllable); WS, the count of syllables in a word; X, the length of a word; SY, the count of the total number of syllables; I, the INSTR value; SC, the count of sentences; and PC, the count of the punctuation marks.

In the statistics display section, Line 1400 calculates the Fog Index and lines 1410 and 1420 calculate the reading score.

#### To Use It

Just move the cursor to your text file and press ENTER. In a minute or two (35 seconds per 100 words) the file's statistics display. The statistics will vary depending on the type of writing, technical or prose; the style, formal or informal; the writer's education level, high or low; and, of course, imperfections of the counting algorithm.

It's best to gauge the meaning of text statistics by analyzing some text that you understand which was written by writers of acknowledged skill. Just remember, TSTATS.BA is only another writing tool, and like a dictionary, a thesaurus, or a grammar book, it won't improve your writing. You have to do that for yourself. Practice.

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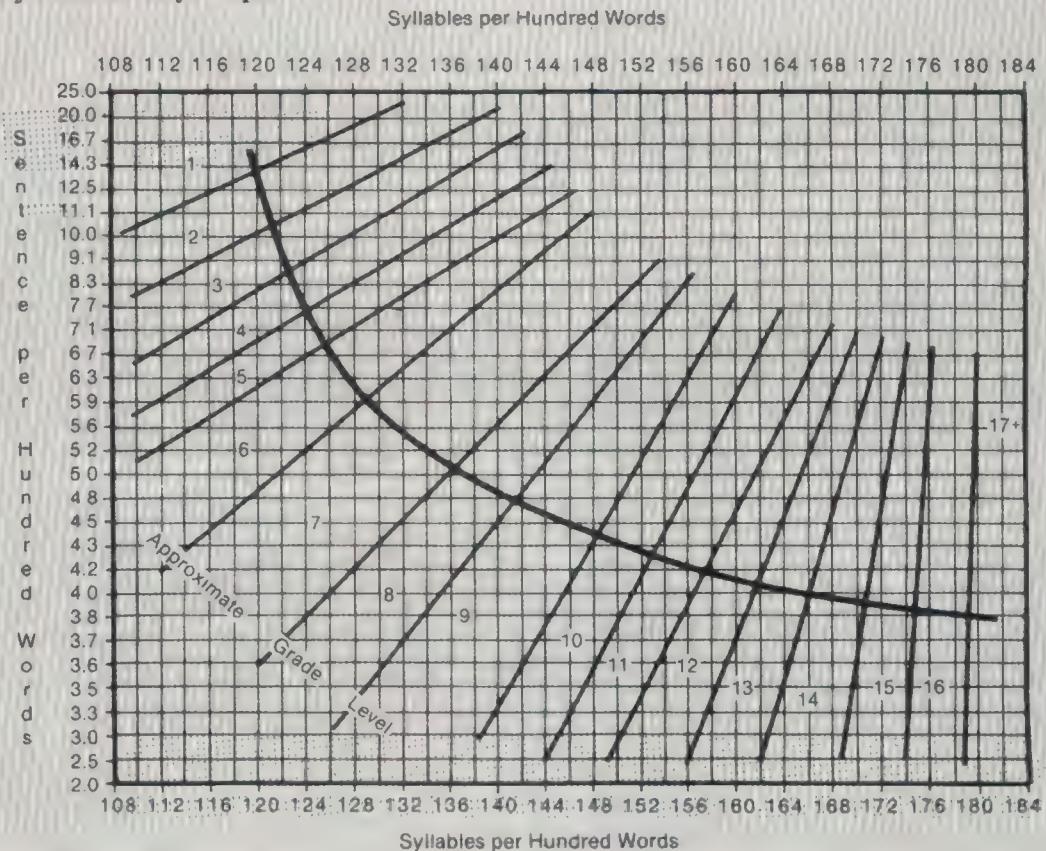
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**Figure 1**  
**Dr. Edward Fry's Readability Graph**



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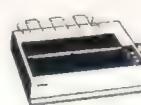
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## The listing:

```

0 TSTATS.BA A TEXT ANALYZER
5 BY RONALD F. BALONIS APRIL 1, 1984
10 CLEAR 500:DEFINT A-Z:DIM SB(10),DX$(2
0)
15 TLE$="--- TEXT ANALYSIS ---"
20 CRLF$=CHR$(13)+CHR$(10)
30 PUNCT$=CHR$(34)+"!,:;":DIR$=""":DX$=""
40 MLS$=CHR$(205)+CHR$(203)+CHR$(18)
50 MLS$=MLS$+CHR$(119)+CHR$(201)
60 FS="[\r\n]":FX$=CHR$(192)
65 CMD$="+++ PRESS <!---CMD PROMPT
70 FOR I=152 TO 155
75 CMD$=CMD$+CHR$(I)
80 NEXT I
85 CMD$=CMD$+">> & <ENTER> +++":I=0:II=0
90 '
95 ---SIGN ON & DISPLAY .DO FILES
100 CLS:PRINT@9,TLE$:PRINT:BEEP
110 X=VARPTR(DIR$):POKE X,240
115 POKE X+1,174:POKE X+2,249
120 I=INSTR(I+1,DIR$,FX$):IF I=0 THEN 14
5
125 DX$=MID$(DIR$,I+1,10)
130 IF MID$(DX$,9,2)<>"DO" THEN 120
135 II=II+1:DX$(II)=DX$:
140 PRINTUSINGF$;MID$(DX$,3,6):GOTO 120
145 PRINT"[ ]MENU":I=1
150 PRINT@284,CMD$,:---SELECT A FILE
155 IF I<1 OR I>II+1 THEN I=1
160 PRINT@71+I*10,"":---FILE CURSOR
165 KB!=PEEK(VARPTR(MLS$)+2)*256
170 KB!=KB!+PEEK(VARPTR(MLS$)+1)
175 KB=0:CALL KB!,0,VARPTR(KB):'ML INKEY
$:
180 IF KB=30 THEN I=I-4
181 IF KB=31 THEN I=I+4
182 IF KB=28 THEN I=I+1
183 IF KB=29 THEN I=I-1
184 IF KB<13 THEN 155
185 IF I=II+1 THEN MENU
190 FS=MID$(DX$(I),3,6)
195 CLS:PRINT@0,FS:PRINT@9,TLE$
200 OPEN FS FOR INPUT AS 1:ANALYZE FILE
205 IF EOF(1) THEN 270 ELSE A$=INPUT$(1,
1)
210 IF INSTR(CRLF$,A$) THEN A$="":
215 IF B$="" THEN IF A$="" THEN 205
220 ---IS IT A SYLABLE?
225 ON INSTR("AEIOUYaeiouy",A$)+1 GOTO 2
45
230 ---COUNT IT
235 ---S=SYLABLE FLAG

```

```

240 IF S=0 THEN WS=WS+1:S=1:GOTO 260
245 S=0:---CONSONANTS RESET FLAG
255 ---READ IN A COMPLETE WORD
260 BS=BS+A$:IF A$<>" " THEN 295
270 IF BS="" THEN 400
275 ---A WORD!
280 X=LEN(B$)-1:A$=MIDS(B$,X,1)
285 '
295 ---COUNT WORDS & LETTERS : BS=WORD
300 WRD=WRD+1:LTRS=LTRS+X:S=0
305 ---FOR WORDS ENDING IN E WS=WS-1
310 IF INSTR("Ee",A$) THEN WS=WS-1
315 IF WS<1 THEN WS=1:---AT LEAST 1
320 ---COUNT SYLABLES
325 SY=SY+WS:SB(WS)=SB(WS)+1:WS=0
330 ---END OF A SENTENCE?
335 IF INSTR(".?!",A$) THEN 390:'YES
340 I=INSTR(PUNCT$,A$):'---PUNCT?
345 ON I+1 GOTO 400,350,395,395,395
350 IF X>1 THEN A$=MIDS(B$,X-1,1)
380 ---END OF A SENTENCE?
385 ON INSTR(".?!",A$)+1 GOTO 400
390 SC=SC+1:---COUNT OF SENTENCES
395 PC=PC+1:---COUNT OF PUNCTUATION
400 PRINT@34,USING"#####";LTRS;
410 X=0:BS="":---GET ANOTHER WORD
420 IF EOF(1) THEN 500 ELSE 295
500 CLOSE 1
600 '
900 ---DISPLAY STATISTICS
1000 CLS:PRINTF$;:PRINT@8,TLE$:BEEP
1010 PRINT"STATISTICS AVG LGTH ";
1015 PRINT"#/100 : SYLB DIST"
1020 PRINTUSING"CHARS #####";LTRS
1030 PRINTUSING"WORDS #####";WRDS
1040 PRINTUSING"SENTS #####";SC
1050 PRINTUSING"PUNCT #####";PC
1060 PRINTUSING"SYLBs #####";SY
1100 XS="###.#"
1110 PRINT@133,USINGX$;LTRS/WRDS;
1120 PRINT@173,USINGX$;WRDS/SC;
1130 PRINT@213,USINGX$;WRDS/PC;
1150 PRINT@181,USINGX$;100*SC/WRDS;
1160 PRINT@221,USINGX$;100*PC/WRDS;
1170 PRINT@261,USINGX$;100*SY/WRDS;
1200 Y=68:---SYLABLE DISTRIBUTION
1210 FOR I=1 TO 5
1220 Y=Y+40
1230 PRINT@Y,USING"###.#";I;SB(I);
1240 PRINTUSING" ##.#";100*SB(I)/WRDS
1250 NEXT I
1400 FOG!=40*(SB(3)+SC)/WRDS
1410 RSC!=100*(SC*1.015+SY*.846)/WRDS
1420 RSC!=206.835-RSC!
1430 FS="FOG=###.# SCORE=###.#"
1500 PRINTUSINGF$;FOG!;RSC!;
1510 PRINT" <PRESS SPACEBAR> ";
1520 IF INKEY$<>" " THEN 1520 ELSE RUN
1530 ---END OF PROGRAM

```

*This utility program lets you print graphics on your DMP series printer*

# Graphics Screen Dump

By Peter T. Lee

The MS-DOS GRAPHICS.COM command is a utility program for reproducing the screen image onto a dot matrix printer. This allows you to make hardcopies of your graphics artwork, charts or other goodies.

The command is external to MS-DOS. This means it is a separate file on the disk and must be loaded into memory like any program. This makes it possible to replace this command without changing MS-DOS at all.

Tandy's version of this command supports only their CGP-220 Color Ink Jet printer at present. They have a much larger line of "DMP" printers capable of graphics, yet these are not supported. The reasoning behind this escapes me.

The program in this article fills the gap. It works exactly like GRAPHICS.COM and will work with Tandy's DMP series printers and a Tandy 1000, 1200, 3000 or any IBM PC compatible computer. Some printers will have to be set to the Tandy mode.

To enter the program, you'll need DEBUG.COM, another external command in MS-DOS version 2.0 or higher, or an assembler.

This program was developed completely using DEBUG which is why there are no comments (sorry about that). If you have any problems or questions, please write me and I'll try to answer as soon as possible.

Here is the dialogue for entering the listing using debug (user entries are in bold type):

```
A> debug
- a100
XXXX:0100 jmp 02fd
XXXX:0103 sti
XXXX:0104 jmp 02b7
```

*(Continue to enter the rest of the listing.)*

```
XXXX:0325 mov dx,02fd
XXXX:0328 int 27
XXXX:032A ENTER
- rbx
BX NNNN
: 0
```

*Peter Lee holds a bachelor of science degree and works as a programmer/consultant. He enjoys skiing and fishing in his spare time.*

```
- rcx
CX NNNN
: 32a
- nsctest.com
- w
writing 032A bytes
- q
A>
```

This will create the program SCNTEST.COM on your diskette in Drive A. To test it, enter SCNTEST at the MS-DOS prompt, go into BASIC and generate a screen of graphics, then hold down the SHIFT key and press the PRINT key. Anything on the screen should now be reproduced by the printer.

To suppress the linefeed character, (you need to do this if you get a blank line between lines in the printout) do this:

```
A> debug scntest.com
- e1b1 0 (If you need to change it back type in e1b1 0a)
- w
writing 032A bytes
- q
A>
```

This program uses Interrupt 5, (the SHIFT-PRINT keys causes this interrupt) and stays resident in memory once it has been called until the system is powered off or rebooted. You can run any program to generate your graphics and, as long as it does not interfere with Interrupt 5 or write over SCNTEST.COM in memory, you can use SHIFT-PRINT to get a screen dump.

SCNTEST has been tested with Tandy's DMP-105 and DMP-430 printers. It should work with the others in the DMP series as well, but it has not been tested with other printers. I hope you'll try it and let me know how it works.

## The listing:

|                  |                |
|------------------|----------------|
| -ulgg 32a        |                |
| 0D29:0198 E9FA01 | JMP 02FD       |
| 0D29:0193 FB     | STI            |
| 0D29:0194 E9B001 | JMP 02B7       |
| 0D29:0197 90     | NOP            |
| 0D29:0198 0000   | ADD [BX+SI],AL |

|                    |      |            |                    |      |            |
|--------------------|------|------------|--------------------|------|------------|
| GD20:010A 0000     | ADD  | [BX+SI],AL | GD20:0195 2407     | AND  | AL,07      |
| GD20:010C 0000     | ADD  | [BX+SI],AL | GD20:0197 2E       | CS:  |            |
| GD20:010E 0000     | ADD  | [BX+SI],AL | GD20:0198 A21201   | MOV  | [0112],AL  |
| GD20:0110 EB0E     | JMP  | 0120       | GD20:019B 90       | NOP  |            |
| GD20:0112 0000     | ADD  | [BX+SI],AL | GD20:019C 2E       | CS:  |            |
| GD20:0114 0000     | ADD  | [BX+SI],AL | GD20:019D A01301   | MOV  | AL,[0113]  |
| GD20:0116 0000     | ADD  | [BX+SI],AL | GD20:01A0 0401     | ADD  | AL,01      |
| GD20:0118 0000     | ADD  | [BX+SI],AL | GD20:01A2 2E       | CS:  |            |
| GD20:011A 0000     | ADD  | [BX+SI],AL | GD20:01A3 A21301   | MOV  | [0113],AL  |
| GD20:011C 0000     | ADD  | [BX+SI],AL | GD20:01A6 EB91     | JMP  | 0139       |
| GD20:011E 0000     | ADD  | [BX+SI],AL | GD20:01A8 07       | POP  | ES         |
| GD20:0120 50       | PUSH | AX         | GD20:01A9 1F       | POP  | DS         |
| GD20:0121 53       | PUSH | BX         | GD20:01AA 5A       | POP  | DX         |
| GD20:0122 51       | PUSH | CX         | GD20:01AB 59       | POP  | CX         |
| GD20:0123 52       | PUSH | DX         | GD20:01AC 5B       | POP  | BX         |
| GD20:0124 1E       | PUSH | DS         | GD20:01AD 58       | POP  | AX         |
| GD20:0125 06       | PUSH | ES         | GD20:01AE C3       | RET  |            |
| GD20:0126 B800B8   | MOV  | AX,B800    | GD20:01AF 90       | NOP  |            |
| GD20:0129 8EC0     | MOV  | ES,AX      | GD20:01B0 B00A     | MOV  | AL,0A      |
| GD20:012B 31C0     | XOR  | AX,AX      | GD20:01B2 30E4     | XOR  | AH,AH      |
| GD20:012D 2E       | CS:  |            | GD20:01B4 31D2     | XOR  | DX,DX      |
| GD20:012E A31201   | MOV  | [0112],AX  | GD20:01B6 CD17     | INT  | 17         |
| GD20:0131 B012     | MOV  | AL,12      | GD20:01B8 B00D     | MOV  | AL,0D      |
| GD20:0133 30E4     | XOR  | AH,AH      | GD20:01BA 30E4     | XOR  | AH,AH      |
| GD20:0135 31D2     | XOR  | DX,DX      | GD20:01BC 31D2     | XOR  | DX,DX      |
| GD20:0137 CD17     | INT  | 17         | GD20:01BE CD17     | INT  | 17         |
| GD20:0139 2E       | CS:  |            | GD20:01C0 C3       | RET  |            |
| GD20:013A A01301   | MOV  | AL,[0113]  | GD20:01C1 50       | PUSH | AX         |
| GD20:013D 3C5C     | CMP  | AL,5C      | GD20:01C2 53       | PUSH | BX         |
| GD20:013F 7C03     | JL   | 0144       | GD20:01C3 51       | PUSH | CX         |
| GD20:0141 EB65     | JMP  | 01A8       | GD20:01C4 52       | PUSH | DX         |
| GD20:0143 90       | NOP  |            | GD20:01C5 1E       | PUSH | DS         |
| GD20:0144 E86900   | CALL | 01B0       | GD20:01C6 06       | PUSH | ES         |
| GD20:0147 B9F03E   | MOV  | CX,3EF0    | GD20:01C7 2E       | CS:  |            |
| GD20:014A 90       | NOP  |            | GD20:01C8 8B1E1401 | MOV  | BX,[0114]  |
| GD20:014B 90       | NOP  |            | GD20:01C9 26       | ES:  |            |
| GD20:014C 90       | NOP  |            | GD20:01CD 8A27     | MOV  | AH,[BX]    |
| GD20:014D 90       | NOP  |            | GD20:01CF 2E       | CS:  |            |
| GD20:014E 90       | NOP  |            | GD20:01D0 A01301   | MOV  | AL,[0113]  |
| GD20:014F 2E       | CS:  |            | GD20:01D3 3C5B     | CMP  | AL,5B      |
| GD20:0150 A01301   | MOV  | AL,[0113]  | GD20:01D5 7406     | JZ   | 01DD       |
| GD20:0153 B307     | MOV  | BL,07      | GD20:01D7 26       | ES:  |            |
| GD20:0155 F6E3     | MUL  | BL         | GD20:01D8 8A4701   | MOV  | AL,[BX+01] |
| GD20:0157 89CB     | MOV  | BX,CX      | GD20:01D9 EB02     | JMP  | 01DF       |
| GD20:0159 B103     | MOV  | CL,03      | GD20:01DD 30C0     | XOR  | AL,AL      |
| GD20:015B D3E8     | SHR  | AX,CL      | GD20:01DF 90       | NOP  |            |
| GD20:015D 01D8     | ADD  | AX,BX      | GD20:01E0 90       | NOP  |            |
| GD20:0161 2E       | CS:  |            | GD20:01E1 90       | NOP  |            |
| GD20:0162 890E1401 | MOV  | [0114],CX  | GD20:01E2 2E       | CS:  |            |
| GD20:0166 E85800   | CALL | 01C1       | GD20:01E3 8A1E1201 | MOV  | BL,[0112]  |
| GD20:0169 2E       | CS:  |            | GD20:01E7 80FB00   | CMP  | BL,00      |
| GD20:016A A11401   | MOV  | AX,[0114]  | GD20:01EA 7505     | JNZ  | 01F1       |
| GD20:016D 3D0000   | CMP  | AX,0000    | GD20:01EC D0EC     | SHR  | AH,1       |
| GD20:0170 7C07     | JL   | 0179       | GD20:01EE EB7A     | JMP  | 026A       |
| GD20:0172 3D4F00   | CMP  | AX,004F    | GD20:01F0 90       | NOP  |            |
| GD20:0175 7F02     | JG   | 0179       | GD20:01F1 80FB01   | CMP  | BL,01      |
| GD20:0177 EB16     | JMP  | 018F       | GD20:01F4 7510     | JNZ  | 0206       |
| GD20:0179 3D401F   | CMP  | AX,1F40    | GD20:01F6 80E401   | AND  | AH,01      |
| GD20:017C 7C05     | JL   | 0183       | GD20:01F9 B106     | MOV  | CL,06      |
| GD20:017E 2D0020   | SUB  | AX,2000    | GD20:01FB D2E4     | SHL  | AH,CL      |
| GD20:0181 EB03     | JMP  | 0186       | GD20:01FD B102     | MOV  | CL,02      |
| GD20:0183 05B01F   | ADD  | AX,1FB0    | GD20:01FF D2E8     | SHR  | AL,CL      |
| GD20:0186 2E       | CS:  |            | GD20:0201 08C4     | OR   | AH,AL      |
| GD20:0187 A31401   | MOV  | [0114],AX  | GD20:0203 EB65     | JMP  | 026A       |
| GD20:018A E83400   | CALL | 01C1       | GD20:0205 90       | NOP  |            |
| GD20:018D EBDA     | JMP  | 0169       | GD20:0206 80FB02   | CMP  | BL,02      |
| GD20:018F 2E       | CS:  |            | GD20:0209 7510     | JNZ  | 021B       |
| GD20:0190 A01201   | MOV  | AL,[0112]  | GD20:020B 80E403   | AND  | AH,03      |
| GD20:0193 0401     | ADD  | AL,01      | GD20:020E B105     | MOV  | CL,05      |

# GROW UP!

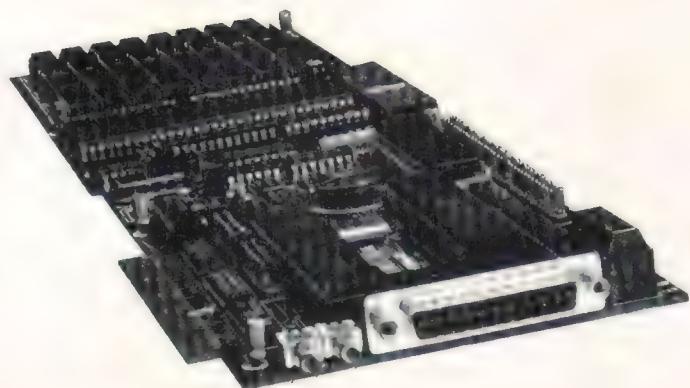
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Without wait states

#### HARDWARE

2 Parallel Ports  
3-9 Serial Ports  
68881 Floating point co-processor (optional)  
Memory mapped dual port bus for high speed DMA transfers  
Real time clock with battery backup  
Up to 16 boards can run concurrently from one AT/XT/PC bus

#### MEMORY

1-2 MB OF RAM  
(1 MB on board standard)  
8K-32K of ROM  
2K-8K of battery backed RAM

**MULTI-USER**  
3-9 users (3 standard)  
High speed "Tick" timer with 10ms accuracy for efficient multi-user time slicing.

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Both support concurrent access to PC DOS

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Software selectable OS environment  
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Powerful asynchronous/synchronous data communications capability  
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#### MISCELLANEOUS FEATURES

Remote and Local reset (hardware or software selectable)  
Remote and Local Non-maskable Interrupts (NMI)  
Stand alone hardware capability (without AT/XT/PC support)

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|                  |      |        |                      |      |                     |
|------------------|------|--------|----------------------|------|---------------------|
| GD20:0210 D2E4   | SHL  | AH, CL | GD20:02AA 30E4       | XOR  | AH, AH              |
| GD20:0212 B103   | MOV  | CL, 03 | GD20:02AC 31D2       | XOR  | DX, DX              |
| GD20:0214 D2E8   | SHR  | AL, CL | GD20:02AE CD17       | INT  | 17                  |
| GD20:0216 08C4   | OR   | AH, AL | GD20:02B0 07         | POP  | ES                  |
| GD20:0218 EB50   | JMP  | 026A   | GD20:02B1 1F         | POP  | DS                  |
| GD20:021A 90     | NOP  |        | GD20:02B2 5A         | POP  | DX                  |
| GD20:021B 80FB03 | CMP  | BL, 03 | GD20:02B3 59         | POP  | CX                  |
| GD20:021E 7510   | JNZ  | 0230   | GD20:02B4 5B         | POP  | BX                  |
| GD20:0220 80E407 | AND  | AH, 07 | GD20:02B5 58         | POP  | AX                  |
| GD20:0223 B104   | MOV  | CL, 04 | GD20:02B6 C3         | RET  |                     |
| GD20:0225 D2E4   | SHL  | AH, CL | GD20:02B7 50         | PUSH | AX                  |
| GD20:0227 B104   | MOV  | CL, 04 | GD20:02B8 53         | PUSH | BX                  |
| GD20:0229 D2E8   | SHR  | AL, CL | GD20:02B9 51         | PUSH | CX                  |
| GD20:022B 08C4   | OR   | AH, AL | GD20:02BA 52         | PUSH | DX                  |
| GD20:022D EB3B   | JMP  | 026A   | GD20:02BB 1E         | PUSH | DS                  |
| GD20:022F 90     | NOP  |        | GD20:02BC 06         | PUSH | ES                  |
| GD20:0230 80FB04 | CMP  | BL, 04 | GD20:02BD B84000     | MOV  | AX, 0040            |
| GD20:0233 7510   | JNZ  | 0245   | GD20:02C0 8ED8       | MOV  | DS, AX              |
| GD20:0235 80E40F | AND  | AH, 0F | GD20:02C2 A04900     | MOV  | AL, [0049]          |
| GD20:0238 B103   | MOV  | CL, 03 | GD20:02C5 3C04       | CMP  | AL, 04              |
| GD20:023A D2E4   | SHL  | AH, CL | GD20:02C7 730B       | JNB  | 02D4                |
| GD20:023C B105   | MOV  | CL, 05 | GD20:02C9 07         | POP  | ES                  |
| GD20:023E D2E8   | SHR  | AL, CL | GD20:02CA 1F         | POP  | DS                  |
| GD20:0240 08C4   | OR   | AH, AL | GD20:02CB 5A         | POP  | DX                  |
| GD20:0242 EB26   | JMP  | 026A   | GD20:02CC 59         | POP  | CX                  |
| GD20:0244 90     | NOP  |        | GD20:02CD 5B         | POP  | BX                  |
| GD20:0245 80FB05 | CMP  | BL, 05 | GD20:02CE 58         | POP  | AX                  |
| GD20:0248 7510   | JNZ  | 025A   | GD20:02CF 2E         | CS:  |                     |
| GD20:024A 80E41F | AND  | AH, 1F | GD20:02D0 FF2E1601   | JMP  | FAR [0116]          |
| GD20:024D B102   | MOV  | CL, 02 | GD20:02D4 31C0       | XOR  | AX, AX              |
| GD20:024F D2E4   | SHL  | AH, CL | GD20:02D6 8ED8       | MOV  | DS, AX              |
| GD20:0251 B106   | MOV  | CL, 06 | GD20:02D8 A00000     | MOV  | AL, [0500]          |
| GD20:0253 D2E8   | SHR  | AL, CL | GD20:02DB 3C01       | CMP  | AL, 01              |
| GD20:0255 08C4   | OR   | AH, AL | GD20:02DD 7502       | JNZ  | 02E1                |
| GD20:0257 EB11   | JMP  | 026A   | GD20:02DF EB15       | JMP  | 02F6                |
| GD20:0259 90     | NOP  |        | GD20:02E1 C606000501 | MOV  | BYTE PTR [0500], 01 |
| GD20:025A 80FB06 | CMP  | BL, 06 | GD20:02E6 E837FE     | CALL | 0120                |
| GD20:025D 750B   | JNZ  | 026A   | GD20:02E9 B01E       | MOV  | AL, 1E              |
| GD20:025F 80E43F | AND  | AH, 3F | GD20:02EB 30E4       | XOR  | AH, AH              |
| GD20:0262 00E4   | SHL  | AH, 1  | GD20:02ED 31D2       | XOR  | DX, DX              |
| GD20:0264 B107   | MOV  | CL, 07 | GD20:02EF CD17       | INT  | 17                  |
| GD20:0266 D2E8   | SHR  | AL, CL | GD20:02F1 C606000500 | MOV  | BYTE PTR [0500], 00 |
| GD20:0268 08C4   | OR   | AH, AL | GD20:02F6 07         | POP  | ES                  |
| GD20:026A 80E47F | AND  | AH, 7F | GD20:02F7 1F         | POP  | DS                  |
| GD20:026D 30C0   | XOR  | AL, AL | GD20:02F8 5A         | POP  | DX                  |
| GD20:026F F6C401 | TEST | AH, 01 | GD20:02F9 59         | POP  | CX                  |
| GD20:0272 7402   | JZ   | 0276   | GD20:02FA 5B         | POP  | BX                  |
| GD20:0274 0C40   | OR   | AL, 00 | GD20:02FB 58         | POP  | AX                  |
| GD20:0276 F6C402 | TEST | AH, 02 | GD20:02FC CF         | IRET |                     |
| GD20:0279 7402   | JZ   | 027D   | GD20:02FD B89000     | MOV  | AX, 0090            |
| GD20:027B 0C20   | OR   | AL, 20 | GD20:0300 2E         | CS:  |                     |
| GD20:027D F6C404 | TEST | AH, 04 | GD20:0301 A30001     | MOV  | [0100], AX          |
| GD20:0280 7402   | JZ   | 0284   | GD20:0304 2E         | CS:  |                     |
| GD20:0282 0C10   | OR   | AL, 10 | GD20:0305 A20201     | MOV  | [0102], AL          |
| GD20:0284 F6C408 | TEST | AH, 08 | GD20:0308 31C0       | XOR  | AX, AX              |
| GD20:0287 7402   | JZ   | 028B   | GD20:030A 8ED8       | MOV  | DS, AX              |
| GD20:0289 0C08   | OR   | AL, 08 | GD20:030C A11400     | MOV  | AX, [0014]          |
| GD20:028B F6C410 | TEST | AH, 10 | GD20:030F 2E         | CS:  |                     |
| GD20:028E 7402   | JZ   | 0292   | GD20:0310 A31601     | MOV  | [0116], AX          |
| GD20:0290 0C04   | OR   | AL, 04 | GD20:0313 A11600     | MOV  | AX, [0016]          |
| GD20:0292 F6C420 | TEST | AH, 20 | GD20:0316 2E         | CS:  |                     |
| GD20:0295 7402   | JZ   | 0299   | GD20:0317 A31801     | MOV  | [0118], AX          |
| GD20:0297 0C02   | OR   | AL, 02 | GD20:031A B80001     | MOV  | AX, 0100            |
| GD20:0299 F6C440 | TEST | AH, 40 | GD20:031D A31400     | MOV  | [0014], AX          |
| GD20:029C 7402   | JZ   | 02A0   | GD20:0320 8CC8       | MOV  | AX, CS              |
| GD20:029E 0C01   | OR   | AL, 01 | GD20:0322 A31600     | MOV  | [0016], AX          |
| GD20:02A0 0C00   | OR   | AL, 00 | GD20:0325 BAFD02     | MOV  | DX, 02FD            |
| GD20:02A2 30E4   | XOR  | AH, AH | GD20:0328 CD27       | INT  | 27                  |
| GD20:02A4 31D2   | XOR  | DX, DX | GD20:032A 0000       | ADD  | [BX+SI], AL         |
| GD20:02A6 CD17   | INT  | 17     |                      |      |                     |
| GD20:02A8 0080   | MOV  | AL, 80 |                      |      |                     |

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diary/scheduler on any computer anywhere that I can use. It is so functional."

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# The following program listings were omitted from "Fun with Filters," January 1986, Page 48.

## Listing of: SCRDISK.BAS

```
40000 REM SCRDISK
40010 DEF SEG=&HE000
40020 OUT &H1A0,&H31
40030 BSAVE"B:FILE1",0,32000
40040 OUT &H1A0,&H32
40050 BSAVE"B:FILE2",0,32000
40060 OUT &H1A0,&H34
40070 BSAVE"B:FILE3",0,32000
```

## Listing of: DISKSCR.BAS

```
40000 REM DISKSCR
40010 SCREEN 0:CLS:KEY OFF:SCREEN 3:COLOR 1,1
40020 OUT &H1A0,&H31
40030 BLOAD"B:FILE1"
40040 OUT &H1A0,&H32
40050 BLOAD"B:FILE2"
40060 OUT &H1A0,&H34
40070 BLOAD"B:FILE3"
```

## Listing of: FGRIDLINE.BAS

```
60000 REM FGRIDLINE
60010 Y1=0:Y2=400
60020 FOR X=0 TO 640 STEP 3
60030 LINE(X,Y1)-(X,Y2),1
60040 NEXT X
60050 X1=0:X2=640
60060 FOR Y=0 TO 400 STEP 3
60070 LINE(X1,Y)-(X2,Y),1
60080 NEXT Y
```

## Listing of: FHORIZN.BAS

```
60000 REM FHORIZN
60010 X1=0:X2=640
60020 FOR Y=0 TO 400 STEP 3
60030 LINE(X1,Y)-(X2,Y),1
60040 NEXT Y
```

## Listing of: FGRIDOTS.BAS

```
60000 REM FGRIDOTS
60010 FOR X=0 TO 640 STEP 3
60020 FOR Y=0 TO 400 STEP 3
60030 PSET(X,Y),1
60040 NEXT Y
60050 NEXT X
```

## Listing of: FOVALDOT.BAS

```
60000 REM FOVALDOT
60010 E=1
60020 FOR R=E TO 125 STEP 2
60030 FOR A=-R TO R
60040 X=(R*R-A*A)
60050 Y=SQR(X)
60060 Y=INT(Y-.5)
60070 PSET(2*(A+30)+260,23-Y+170),7
60080 PSET(2*(A+30)+260,23+Y+170),5
60090 NEXT A
60100 NEXT R
```

## Listing of: FGRIDTH.BAS

```
60000 REM FGRIDTH
60010 FOR Y=0 TO 400 STEP 3
60020 FOR X=0 TO 640 STEP 3
60030 PSET(X,Y),4
60040 NEXT X
60050 NEXT Y
```

## Listing of: FBORDER.BAS

```
60000 REM FBORDER
60010 LINE(1,1)-(638,398),4,B
60020 LINE(0,0)-(639,399),4,B
60030 LINE(5,5)-(634,394),4,B
60040 LINE(2,2)-(637,397),4,B
60050 LINE(4,4)-(635,395),4,B
60060 LINE(3,3)-(636,396),4,B
60070 LINE(6,6)-(633,393),6,B
```

## Listing of: FCOSINE.BAS

```
60000 REM FCOSINE
60010 FOR I=1 TO 639 STEP 5
60020 LINE(I+3,0)-(639,I),1
60030 LINE(639-(I+3),399)-(0,399-I),2
60040 LINE(0,399-I)-(I,0),3
60050 LINE(639,I)-(639-I,399),4
60060 NEXT I
```

#### Listing of: FVERTICL.BAS

```
60000 REM FVERTICL
60010 Y1=0:Y2=400
60020 FOR X=0 TO 640 STEP 3
60030 LINE(X,Y1)-(X,Y2),1
60040 NEXT X
```

#### Listing of: FDIAGLDN.BAS

```
60000 REM FDIAGLDN
60010 Y1=400:Y2=0
60020 FOR X=639 TO 0 STEP -12
60030 LINE(0,400)-(X,Y2),1
60040 NEXT X
60050 X1=0:X2=640
60060 FOR Y=399 TO 0 STEP -12
60070 LINE(0,400)-(X2,Y),1
60080 NEXT Y
```

#### Listing of: FDIAGLFT.BAS

```
60000 REM FDIAGLFT
60010 Y1=400:Y2=0
60020 FOR X=639 TO 0 STEP -12
60030 LINE(0,400)-(X,Y2),1
60040 NEXT X
60050 X1=0:X2=640
60060 FOR Y=399 TO 0 STEP -12
60070 LINE(0,400)-(X2,Y),1
60080 NEXT Y
60090 Y1=0:Y2=400
60100 FOR X=1 TO 639 STEP 12
60110 LINE(0,0)-(X,Y2),1
60120 NEXT X
60130 X1=0:X2=640
60140 FOR Y=0 TO 399 STEP 12
60150 LINE(0,0)-(X2,Y),1
60160 NEXT Y
```

#### Listing of: FDIAGLR2.BAS

```
60000 REM FDIAGLR2
60010 Y1=400:Y2=0
60020 FOR X=639 TO 0 STEP -12
60030 LINE(640,400)-(X,Y2),1
60040 NEXT X
60050 X1=640:X2=0
60060 FOR Y=399 TO 0 STEP -12
60070 LINE(640,400)-(X2,Y),1
60080 NEXT Y
60090 Y1=0:Y2=400
60100 FOR X=1 TO 639 STEP 12
60110 LINE(0,0)-(X,Y2),1
60120 NEXT X
60130 X1=0:X2=640
60140 FOR Y=0 TO 399 STEP 12
60150 LINE(0,0)-(X2,Y),1
60160 NEXT Y
```

#### Listing of: FDIAGRHT.BAS

```
60000 Y1=400:Y2=0
60010 FOR X=639 TO 0 STEP -12
60020 LINE(640,400)-(X,Y2),1
60030 NEXT X
60040 X1=640:X2=0
60050 FOR Y=399 TO 0 STEP -12
60060 LINE(640,400)-(X2,Y),1
60070 NEXT Y
60080 Y1=0:Y2=400
60090 FOR X=640 TO 0 STEP -12
60100 LINE(640,0)-(X,Y2),1
60110 NEXT X
60120 X1=640:X2=0
60130 FOR Y=0 TO 399 STEP 12
60140 LINE(640,0)-(X2,Y),1
60150 NEXT Y
```

#### Listing of: FDIAGLUP.BAS

```
60000 REM FDIAGLUP
60010 Y1=0:Y2=400
60020 FOR X=1 TO 639 STEP 12
60030 LINE(0,0)-(X,Y2),1
60040 NEXT X
60050 X1=0:X2=640
60060 FOR Y=0 TO 399 STEP 12
60070 LINE(0,0)-(X2,Y),1
60080 NEXT Y
```

Listing of: FDIAGPLS.BAS

```
60000 REM FDIAGPLS
60010 Y1=400:Y2=0
60020 FOR X=639 TO 0 STEP -12
60030 LINE(0,400)-(X,Y2),1
60040 NEXT X
60050 X1=0:X2=640
60060 FOR Y=399 TO 0 STEP -12
60070 LINE(0,400)-(X2,Y),1
60080 NEXT Y
60090 Y1=0:Y2=400
60100 FOR X=1 TO 639 STEP 12
60110 LINE(0,0)-(X,Y2),1
60120 NEXT X
60130 X1=0:X2=640
60140 FOR Y=0 TO 399 STEP 12
60150 LINE(0,0)-(X2,Y),1
60160 NEXT Y
60170 Y1=400:Y2=0
60180 FOR X=639 TO 0 STEP -12
60190 LINE(640,400)-(X,Y2),1
60200 NEXT X
60210 X1=640:X2=0
60220 FOR Y=399 TO 0 STEP -12
60230 LINE(640,400)-(X2,Y),1
60240 NEXT Y
60250 Y1=0:Y2=400
60260 FOR X=640 TO 0 STEP -12
60270 LINE(640,0)-(X,Y2),1
60280 NEXT X
60290 X1=640:X2=0
60300 FOR Y=0 TO 399 STEP 12
60310 LINE(640,0)-(X2,Y),1
60320 NEXT Y
60330 Y1=0:Y2=400
60340 FOR X=0 TO 640 STEP 3
60350 LINE(X,Y1)-(X,Y2),0
60360 NEXT X
60370 X1=0:X2=640
60380 FOR Y=0 TO 400 STEP 3
60390 LINE(X1,Y)-(X2,Y),0
60400 NEXT Y
```

Listing of: FDIAGLR4.BAS

```
60000 REM FDIAGLR4
60010 Y1=400:Y2=0
60020 FOR X=639 TO 0 STEP -12
60030 LINE(0,400)-(X,Y2),1
60040 NEXT X
60050 X1=0:X2=640
60060 FOR Y=399 TO 0 STEP -12
60070 LINE(0,400)-(X2,Y),1
60080 NEXT Y
60090 Y1=0:Y2=400
60100 FOR X=1 TO 639 STEP 12
60110 LINE(0,0)-(X,Y2),1
60120 NEXT X
60130 X1=0:X2=640
60140 FOR Y=0 TO 399 STEP 12
60150 LINE(0,0)-(X2,Y),1
60160 NEXT Y
60170 Y1=400:Y2=0
60180 FOR X=639 TO 0 STEP -12
60190 LINE(640,400)-(X,Y2),1
60200 NEXT X
60210 X1=640:X2=0
60220 FOR Y=399 TO 0 STEP -12
60230 LINE(640,400)-(X2,Y),1
60240 NEXT Y
60250 Y1=0:Y2=400
60260 FOR X=640 TO 0 STEP -12
60270 LINE(640,0)-(X,Y2),1
60280 NEXT X
60290 X1=640:X2=0
60300 FOR Y=0 TO 399 STEP 12
60310 LINE(640,0)-(X2,Y),1
60320 NEXT Y
```

Listing of: FCIRCLE.BAS

```
60000 REM FCIRCLE
60010 FOR X=1 TO 390 STEP 3
60020 CIRCLE(320,200),X,4
60030 NEXT X
```

*Knowing what's going on behind the scenes of BASIC can help improve programming techniques*

# Interpreting BASIC's Interpreter

By Dan Keen

**I**t is important to understand how the BASIC interpreter in your computer "interprets" or acts in given situations. BASIC can give some seemingly strange responses to certain statements. We must be able to predict how our particular version of BASIC will handle instructions.

In this article, we will take a brief look at the way BASIC thinks, see ways to speed up program execution and explore some of the screwy aspects of BASIC.

## Order of Operations

BASIC makes certain assumptions. It also performs operations in a predictable fashion. To first demonstrate those points, let's examine BASIC's "order of operation."

When BASIC executes math expressions, it follows a systematic order. First, it performs calculations that are inside parentheses. Next, it performs multiplication or division operations proceeding left to right through the expression. Finally, any addition or subtraction is done, again, going left to right.

The importance of knowing how the computer will handle an expression can be demonstrated with the following statement:

$X = 10 / 5 * 2$

It says, variable  $X$  equals 10 divided by five multiplied by two. If we multiply five by two, we get 10. If we then divide 10 by 10, we arrive at a value of one for  $X$ . However, if we first divide 10 by five, resulting in two, and multiply that by two,  $X$  would be four. So here is a problem which could have two answers! Which way will the machine do it? Following our rules for "order of operations," we see that the computer works from left to the right of the expression. Therefore, the correct answer four.

Try this one:

$N = 2 * 2 + (3+1)$

The value of  $N$  could be either four or 12, depending on which operations you perform first. What value will  $N$  be when this statement is run under BASIC?

## Two Equal Signs

At first glance, you might think the following statement would generate a syntax error:

$20 LET A = B = C$

Surprisingly, it does not! Try it on your computer. Many versions of BASIC interpret the second equal sign as a *logical operator*. In other words, it kind of acts like an IF/THEN statement and a boolean algebra computation.

In logic comparisons, two states can exist, "true" and "false." BASIC interpreters typically return values of zero if a test is false and -1 if true (or some non-zero value). Therefore, the statement  $LET A = B = C$  will be interpreted by BASIC to say "if  $B$  is equal to  $C$ , assign  $A$  a value of -1; otherwise, assign  $A$  a value of zero." It could be rewritten as:

$IF B = C THEN A = -1 ELSE A = 0$

The advantage of using  $A=B=C$  over the IF/THEN statement is obviously brevity. Although it is legal, many programmers may frown upon its use since it is not as clear to the person looking at the program listing as the IF statement would be. One of the drawbacks to BASIC compared to other programming languages is its inherent lack of documentation. Such statements as this make it all the harder to figure out what is going on in a program.

Logical operators are interesting, and you may wish to study the sections on AND, OR and NOT in your BASIC owner's manual for more information.

## More BASIC Assumptions

BASIC may alter things you type in. Key in this statement:

$10 N = 0000$

Now list the program. Even though you have not edited nor run the program, BASIC has made a change. The line now reads

$10 N = 0$

Under GW-BASIC on the Tandy 1000 and 2000, we tried entering this statement:

$10 N = 123456789$

Again, BASIC shows it has a mind of its own. Typing LIST now reveals that BASIC stuck a pound sign (#) on the tail end of the number:

$10 N = 123456789#$

## Speeding up Execution

By knowing a few things about BASIC, we can speed up the execution of our BASIC programs.

Most programmers know a few tricks for speeding up programs and saving bytes of memory, such as deleting all REM statements, using multi-statement lines when possible, using subroutines and not over dimensioning arrays.

Perhaps you might not be aware of some other tricks. Structure your calculations so as to use as few parentheses as possible (it takes several bytes to process parentheses).

Subroutines should be placed at the beginning of a program. DATA statements should also be located among the first few lines of the program. When the computer encounters a READ statement, it begins searching from the top of the program for DATA. Naturally, if the DATA is located in one of the first lines of the program, it doesn't have to look very long to find it.

Subscripted variables (arrays) should be avoided in calculations and in FOR/NEXT loops.

Use frequently-defined variables early in the execution of a program.

BASIC develops variable lists as the program progresses. Those first used are first on the list, and so will be found the quickest.

When string variables are no longer used in a program, null them out by setting them equal to a null string ( $A$ = ""$ ). Nulling a string variable changes its length to zero. BASIC will have to do less searching since this minimizes the number of variables in use.

## Conclusion

Hopefully, we have presented some useful programming techniques and stimulated you to experiment with your version of BASIC. Books and manuals don't tell you all the things you can do with a language. You have to read between the lines and log in some time sitting at your console. Making discoveries is the fun part of programming!

# MS-DOS Volume 1

## An Excellent Tutorial

Book

1000/1200/2000/3000

*MS-DOS, Volume 1, The Basics* is the newest addition in the Tandy family of tutorial manuals. Written by David A. Lien and Gary Williams, this compact book is an introduction to MS-DOS and its use with the Tandy 1000, 1200HD and 2000 computers. The book is conveniently divided into an introduction and four parts.

The introduction, though only a few pages in length, clearly explains the general purpose of a disk operating system and gives a brief description of MS-DOS. It also states the book's theme: "This book will take you through the most basic commands and teach you how to do the things you're likely to need in your day-to-day use of the computer. From here on, you'll learn by doing." And learn by doing is the key approach throughout the book.

Part One is entitled "Startup to Shutdown." It consists of four chapters on the rudiments of MS-DOS. You are gently led through the initialization process of loading MS-DOS and setting the date and time. Also, there is a brief description of the system prompt. The book proceeds to describe several initial MS-DOS commands: DATE, TIME, DIR, CLS and PRINT. As is the general approach throughout the book, you are asked to enter the commands and view your computer's display, which should, if all goes well, be similar to the displays

given in the book. This technique is a quick and easy way to learn; it is also a recognizable hallmark for those who are familiar with David Lien's previous works.

The last chapter of Part One is a short but comprehensive review that outlines the commands and their functions, along with the authors' notes about the proper startup and shutdown procedures.

Part Two, "Using MS-DOS to Prepare Your Diskettes," begins with two brief paragraphs on the compatibility of the Tandy 1000 and 1200HD with the IBM PC. The authors conclude, "[compatibility] means software that runs on the IBM will usually run on these two machines." The key word, of course, is *usually*. Experience dictates that you should actually test, if possible, any IBM software on a Tandy before buying. Furthermore, the authors fail to consider the question of the compatibility of IBM software with the Tandy 2000, though generally IBM PC software will not operate on the 2000. The information given here is so sparse and impractical that the subject of compatibility could have been left out entirely.

The chapter continues with a brief but thorough discussion about disk capacities, both floppy and hard disks, and the differences in floppy diskette storage capacity among the three computers: Tandy 1000, 1200HD and 2000. Although this information has little to do with using MS-DOS, it is informative.

The remaining chapters of Part Two

deal with the practical side of using MS-DOS. Step-by-step explanations, along with examples, are given for formatting floppy diskettes and formatting a hard disk. At each step of the procedure, simulated displays are given which will help you through the process — particularly the formatting of a hard disk, which can be somewhat complicated. The discussion is clear, concise, and the explanations are uncluttered with technical jargon.

Following the presentation on formatting, the book covers the various procedures for copying files, whether you're using floppy diskettes or a hard disk. Detailed explanations are presented on how to use the formatting and copying commands of MS-DOS: HSECT, FDISK, CONFIG.D, FORMAT, HFORMAT, BACKUP, RESTORE and COPY. Not all of these commands will work with all three Tandy computers. At appropriate junctions in the discussion, there are sections set aside explaining the differences in commands that exist among the three slightly-different MS-DOSs — an added feature which is quite helpful.

The remaining chapters of Part Two

describe the MS-DOS commands for duplicating and checking diskettes: DISKCOMP (for the Tandy 1000 and 1200HD), COMPUDE (for the Tandy 2000) and CHKDSK. These chapters will help you understand the importance of maintaining current backups of your diskettes, as the authors state, "backup copies of diskettes are a way of life with computers." Although the discussion is brief, it will help you to avoid the agony of lost data.

The last chapter of Part Two is a review of the MS-DOS commands covered in the previous chapters. The commands and their functions are listed under the specific Tandy computer for which they will work.

Part Three is entitled "Using MS-DOS to Manage Your Files." The first chapter begins by defining the three major categories of disk files: programs, data and system files. It continues by briefly discussing two other types: batch and BASIC files.

To illustrate the use of disk files, the authors list three BASIC programs which are used in subsequent discussions. The programs are short and simple. Detailed instructions are given for entering

them into your computer.

Using the three BASIC program files, MATH.BAS, GREETING.BAS and CONVERT.BAS, the MS-DOS COPY command is discussed in detail. By the time you've gone through the explanations and examples, especially the chapter on shortcuts and wildcards, you'll be thoroughly familiar with, if not an expert on, managing disk files.

The most important topics in the book, beginning with Chapter 19 and continuing through Chapter 24, are the creation and manipulation of data files via MS-DOS. The authors demonstrate how to combine, print, rename, sort and search files, by working through excellent examples. The commands presented are: COPY CON, COPY CON PRN, PRINT, RENAME, SORT and FIND. Here is where the real power of MS-DOS begins to shine. Using these commands in various combinations, the book clearly shows you how versatile MS-DOS is in managing files.

The last topic of the book is the MS-DOS text editor, EDLIN. EDLIN is not a command, but a stand alone utility program that allows you to create and edit your own disk files. It can also be

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used to create batch file "programs" that can perform tasks automatically. Since the program contains its own command structure and functions, the authors state: "we won't attempt to provide a complete course in EDLIN in this introductory book . . . Volume 2 covers the subject in full detail."

You are shown, though, how to create a sample file and how to use a few of EDLIN's commands for text insertion,

text deletion, printing and saving the completed file. There is much more to EDLIN, but our appetites are sufficiently whetted for Volume 2.

The last chapter is an inclusive review of the material presented in Part Three. All of the MS-DOS commands are listed along with their functions and descriptions.

Overall, *MS-DOS, Volume 1, The Basics* is an excellent tutorial. It is

written in a smooth, succinct style without the verbiage often found in other manuals. By the time you've gone through it — and you'll be amazed how little time it does take — you'll be anxiously awaiting Volume 2, as I am.

(Compusoft Publishing, 535 Broadway, El Cajon, California 92021, \$7.95)

— Ralph Rideout

Software 1000/1200/2000/3000

## *The 1040 Solution Eases Tax Preparation*

It's that time of year for many of us to file our tax returns for 1985. There are some who do their own taxes but some turn to accountants. Either way, we strive for accuracy and speed when preparing our returns.

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plete answer to our problems — *The 1040 Solution*. *The 1040 Solution* is available for the Tandy 2000-HD and any IBM PC-XT compatible. There is also a version for the Tandy Model 16. The minimum requirements for the Tandy 2000 are 256K and a 132 column parallel printer, one 5.25-inch quad-density floppy disk per 20 tax clients and MS-DOS 2.0.

If you are a professional tax preparer, then this system will solve your tax preparation problems. *The 1040 Solution* will prepare the following forms and schedules: 1040, Pages 1 and 2, 1040 ES, 1116, 2106, 2119, 2210, 2441, 3468, 3903, 4136, 4255, 4562, 4797, 4835, 4972, 5695, 5884, 6251, 6252, Schedules

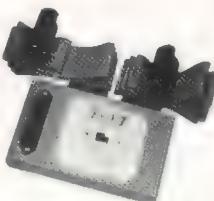
A, B, C, D, E, F, G, R, RP, SE and W.

One of the nicest aspects of *The 1040 Solution* is the easy input features. The video screens coincide exactly with the input sheets supplied for all the tax forms processed. If you have used *COMPUTAX* or *FASTTAX* before, then this data entry form will feel familiar.

The system allows you to enter the data directly during the client interview, or operators can enter the data from the client data sheets. Once the data is entered, you can calculate the taxes in just a few seconds, or you can recall the data for editing by going directly to the display which needs editing or updating. As an example of this updating

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feature, when I was preparing my taxes with my accountant, I found out I was going to owe over \$500 in additional taxes. We determined how much it would take to add to my IRA and Kroegh accounts to reduce my taxes to a small refund. It took less time to do it than trying to describe it here.

Creative Solutions has another nice feature available — the ability to generate annual pro-forma data sheets from year to year. This feature reduces the data entry time by transferring forward each year the information such as depreciation, taxes paid to state and the IRS, adjusted gross income for income averaging, the number of dependents and their names and other information necessary for the next tax year. It's nice to be able to start on the next year's taxes without having to re-enter all the client's information.

*The 1040 Solution* has other important features. It will automatically calculate the lowest tax alternative either by income averaging or the appropriate tax table. It will prepare three different Schedule C's and two different 2106s, handle six installment sales and nine schedule E rental units. It will also

do subscheduling for Schedule B, Schedule E partnerships, estates and SBC's.

Even if you're not a tax accountant, this system has such easy data entry that with a few minutes of reading the easy-to-use manual, you can start preparing tax returns. The manual has on the left page a picture of the data entry screen for the appropriate form and the accompanying right page offers brief explanations of what data or codes need to be placed in each data field.

You can start with any data entry screen and the tax information can be entered in any order. It allows for spouse, joint or taxpayer attributes. There are express keys which allow you to move anywhere on the screen quickly and what you see is what you get. There are no tax line numbers to remember and all calculations are completed after the data is entered so there is no wait for calculation delays. A typical calculation time is in the 30- to 90-second range, even for some tough tax situations. Sales taxes for each state are automatically computed or can be overridden by the actual amount. You can get a quick review of the tax due/

refund and all schedule amounts at any time. Any screen can also be easily dumped to the printer.

Perhaps the most important part of a good tax system is the ability to get the information to the IRS. *The 1040 Solution* has several options for the printing of the tax forms. First, the 1040 forms must be on the original forms which is easily handled in two ways: using an overlay, or printing directly onto the form. The other forms can be printed as the 1040 forms or you can use the computer generated forms printing. You can either do individual return printing or you can do a batch printing of up to 40 clients.

After you've prepared and printed the tax forms, you need to be paid. *The 1040 Solution* allows you to prepare client transmittal letters which will also print the tax due or tax refund amounts in the letter body. Estimated tax payments can be similarly handled. The text of each letter can be constructed from paragraphs in your library. To accompany the letters, there is the invoice, also automatically prepared from the data entered for each tax form used or upon some other standard rate.

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Creative Solutions also produces integrated state tax returns for Arkansas, Illinois, Indiana, Michigan, New York, North Carolina and Oklahoma. Outside developers can supply other state programs. These state return packages use the information entered in *The 1040 Solution* system.

As with any major piece of software, the real savings comes in the amount of support you receive from the vendor. Creative Solutions publishes on a regular basis, *The Balance Sheet*, which supports the user with aids, some promotional material, notices of new software delivery dates and a list of users. Once a year there is a user conference presented to interested users. For the price of *The 1040 Solution*, you also get

a guaranteed renewal rate and three hours of consultation. After three hours, you will be billed \$40 per hour. During a phone conversation concerning the use of *The 1040 Solution*, Creative Solutions, Inc. was extremely knowledgeable and helpful in solving several minor problems I created.

If you are interested in a professional tax preparation system, then I recommend that you seriously consider *The 1040 Solution* for its ease of use and excellent support.

(Creative Solutions, Inc., 230 Collingwood, Suite 250, Ann Arbor, MI 48103. 313-995-8811. \$1495 for the 1985 version, 3/4 cost of 1985 version for 1986 renewal.)

— Vincent Lord

page manual and a pocket-size "Quick Reference" guide. The manual is more than adequate and includes sample data to step through some simple exercises. Disk/Video Interface users take note: The manual also indicates "*Interactive Solutions* is not meant to be used on the Disk/Video Interface."

Installation is literally a snap — snap off the rear compartment door and snap in the ROM module. You do need to exercise some care in handling the ROM module, however, because it is sensitive to static electricity.

To use *Interactive Solutions*, you first enter a two line BASIC program. From then on, running the program is a matter of pointing at the BASIC program INTSOL on the main menu and pressing ENTER.

Once you start the program, you are presented with the opening menu selection of the three programs and one of the finest user interfaces around. Menus include the list of function keys on the bottom line of the LCD. To choose a menu item, you can either press a function key or type the first letter of the item name. *Interactive Solutions* combines the Model 100's use of function keys with the commonly-used "first initial selection" to make menus comfortable to all.

Data Manager lets you "paint" a format on the screen to assign field names, lengths and characteristics of your database. Once defined, you can begin making entries into your new file. The total form size is not limited to the Model 100's screen size, but can be up to 20 lines long and up to 254 characters. The total number of labels and fields possible is 20, with each label

having 16 or fewer characters. The layout for each file is stored separately as a special text file which, as the manual cautions, should only be changed using *Interactive Solutions*.

If you do have to change the record layout, you may be in trouble. When modifying a layout, you cannot add or delete a field, change the length of any field, change the order of fields, change the placement of the decimal point, or even change the length of a "comment" label such as the form name. So if the final field of the final record is one character short, you will have to start over and redesign the form and re-enter all the data records.

Entering information is a simple matter of filling in the blanks. Better yet, this same blank layout form is used again and again for locating specific records, designing printed reports and even transferring selected information from the Data section to the Word or Calc sections. Updating entries is a matter of locating the record and making any necessary changes. Data offers flexible search abilities to make locating records a simple process.

The items in a file can be printed in any order and selected based on whatever criteria you choose. The maximum width of a report is a disappointing 80 characters or nine columns. This is particularly frustrating since even standard-width dot-matrix printers can produce 132 characters in condensed mode. Reports can be sorted on a single field in either ascending or descending order.

If you don't have a printer handy or if you want to integrate your report into a Word document, *Interactive Solutions* features a unique ability to copy the report into the Model 100 "paste" buffer. Once the report is in the paste buffer, simply edit any document, position the cursor where you want the report and press PASTE. But a word of caution — if you exit *Interactive Solutions*, the paste buffer is cleared. Make sure you paste your report before returning to the 100's menu.

There are times when you need to return to the main menu. Unlike many programs which prompt you for filenames and supply you with a display of all files, *Interactive Solutions* does not offer any means of checking filenames. So if you forget a name, as I often do, you'll be checking back with the menu and losing the paste buffer.

Moving information from Data onto the Calc sheet is even nicer. All the

## Interactive Solutions — Database, Word Processing and Spreadsheets in ROM

Nothing is so characteristic of the Model 100 as ROM software. This ever-present program magic is the secret of the portable's success. The promise of future wonders in plug-in ROM made the Model 100 an attractive machine from the beginning. Unfortunately, the secret of additional ROMs remained hidden for far too long.

*Interactive Solutions* is Tandy's latest entry in snap-in ROM software. The main virtue of *Interactive Solutions* and all ROM software is that it is fast and does not use any precious memory.

*Interactive Solutions* consists of three components: Data Manager, Data Calc and Word Processor. Data Manager is a screen-oriented filing system. Data Calc has spreadsheet-like calculation ability and Word Processor is a versatile text formatter with a door to the built-in Text program and mail merge capabilities. The whole is truly greater than its parts because each module can "interact" with the others.

The documentation supplied with *Interactive Solutions* is good. Tandy has once again provided both an 82-

selection is done after entering Data Calc. Requesting a load from a Data file brings up the same layout form with all the same rules for choosing the records and fields to be incorporated in the worksheet. The fields are retrieved in the order specified, one record to a row.

Data Calc is a respectable size spreadsheet with 99 rows by 99 columns. It incorporates all the basic math operators as well as a variety of built-in statistical and trigonometric functions. Like all computer spreadsheets, Calc allows you to locate the text labels and numbers on the grid exactly as you would on paper. If you start an entry with a letter, Calc assumes a label; start with a number or a plus (+) or minus (-) sign and Calc assumes a number is being entered. The distinction is important not only for how the entry is aligned in the cell, (left or right) but also for how the entry is treated by formulas.

Formulas are the heart of the spreadsheet. They make minor or major changes simple. Calc uses column or row formulas. Once you enter a formula anywhere in a column or row, the formula is in effect for the *entire* row or column. If you have used a spreadsheet like *Lotus 1-2-3*, that's quite a switch.

Besides the unique situation with formulas, there are a few notable features missing from Calc. There is no way to move information from one part of the sheet to another. It is possible to insert rows or columns, but this does not address all needs. Also missing is a quick way to move the cell pointer from one location to another. This can be a real nuisance if worksheets grow.

Printing a spreadsheet is a simple matter of indicating what you want printed. You cannot send printer codes from Calc, however, so if you want to use condensed print, you must set up your printer from BASIC first or paste the spreadsheet to the Word section (if you have enough memory). As with the Data section, any information on a Calc sheet can also be included in a Word document by using the paste buffer to transfer it.

The Word Processor is the final component. Choosing Word from the *Interactive Solutions* menu leads you to another choice. Word allows an exit to the Text program for creating and editing documents. There is also a selection for building a print "control" file of formatting choices. Merging text with information from a Data file is the

third menu option and printing is the final option.

Word is one of the many answers to the need for a companion to Text offering more sophisticated print formatting. The formatting capabilities of Word are fairly complete. You can build a control file for any document to set margins, page length, justification and line spacing. With "dot commands" in the document, you can also override any of the settings in the control file either temporarily or for the remainder of the document. Word also handles headers and footers, but each is limited to a single line.

As mentioned, you can paste information from either the Data or Calc sections into your documents. Word has a further connection to Data with the "mail-merge" feature. After creating a document with field names from a Data file, you can choose the merge option and select the records to be merged from the familiar layout screen. Word does the rest!

Special printer codes are often a problem. No matter how many printers a program supports, yours is usually not one of them. *Interactive Solutions* has a very simple solution to this dilemma.

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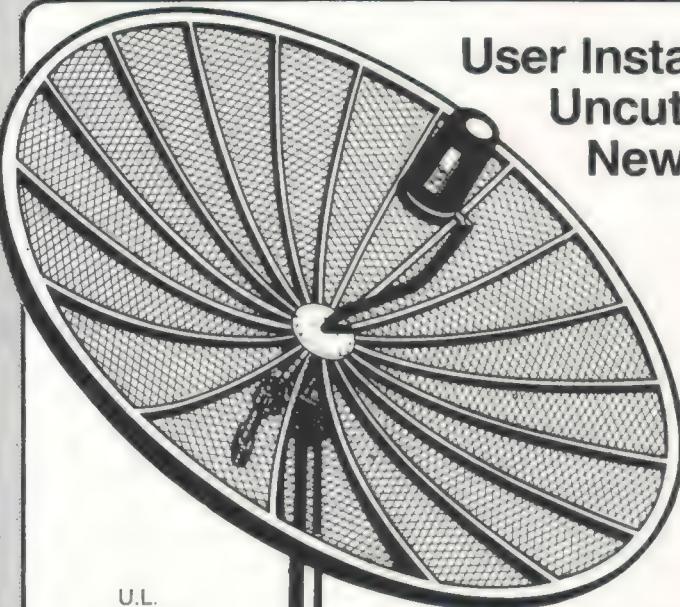
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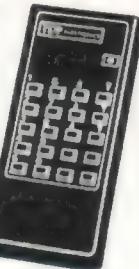
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A PRT.DD file, which you can customize, establishes all special printer functions such as underlining, condensed print and bold, and it allows you to give each one a single-letter name. That way, no matter what your printer, *Interactive Solutions* can take advantage of its special print functions. My only complaint is that special print controls do not work in headers and footers. The manual neither mentions nor explains this omission.

Probably the most useful feature that Word lacks is some form of on-screen print preview. The only way to check such items as line ends, page ends and overall appearance is to print the document. And you will need to check page ends since Word does not correct for one line "widows" and "orphans" at the

bottom and top of pages, respectively.

If your primary needs are for data tracking and print formatting, with some light spreadsheet work, *Interactive Solutions* may be just the ROM for you. It's fast and it leaves all your precious RAM for data storage. Like all integrated programs, *Interactive Solutions* offers a common interface and good information sharing among the applications. Also, like most integrated software, it sacrifices some important functions — particularly in Data Calc. Fortunately, while individual modules may be lacking, they add up to the secret of ROM.

(*Interactive Solutions* distributed by Radio Shack, Cat. No. 26-3844, supplied on plug-in ROM, requires 16K, \$149.95)

Software

1000/1200/3000

## 20th Century Shoebox — A Catch-All Filing System

What do you do with a shoebox? Stuff it with baseball cards, marbles, strange-looking pennies, lucky stones, and then, later in life, the more mundane coupons, bills or receipts. This is the "entry-first accounting" premise of *Twentieth Century Shoebox*, a personal finance manager written in *Turbo PASCAL* from Levins Engineering.

The idea is to throw information into your "shoeboxes," (files) and worry about organizing them later. No knowledge of accounting is necessary, and in less than an hour, you should be familiar enough with the material to start working.

The non-protected disk contains two sample files and a one-page tutorial. The latter is probably insufficient for most users, but the excellent, context-sensitive, on-line help screens more than make up for this weakness. Also included are directions for starting four files — Tax Records, Coupon Organizer, Travel Expenses and Computer Use Log.

You are always in one of four modes: Enter (to enter new information); Browse (to look through and/or edit existing entries); Report (to write to

either screen or printer either full or partial reports); and System (to return to DOS, change to color or B/W mode and to choose to work on either a new or existing file). These four options are displayed at the bottom of the screen, and moving from one to another is a simple, one-key operation. Also displayed are the current file, available functions and the last entry.

Perhaps a description of a file I created would best outline the procedures. I first chose the name "Hobbies" in System mode to start a new shoebox, then pressed ESC to go to Enter mode. Immediately, I was prompted for the data and amount (limited to four digits plus two decimal places) of the first entry. For the prompt "Notes" (limited to 10 characters or less) I entered "Hardware," for "Tag" (limited to 18 characters or less) "Radio Shack," and for "Category," (limited to 11 characters or less) "Computer." For my second record, after the date and amount, I entered "Jazz CD," "Ernie's Emporium" and "Music." For the third, I typed "Literature," "Walden's" and "Books." For the fourth entry, I used "Software V" ("V" for VISA) and "Radio Shack." Since I had the "Tag-Matching" option on, the category "Computer" was automatically chosen by the program.

That's it! Just keep adding records, making any changes or modifications you wish at any time. Note the extreme flexibility of the program, as well as the use of multiple notes. No formal structuring is required prior to beginning a file, although, as in most programs, the more thought given to set-up, the more streamlined the file.

By now moving into Report mode, it is possible to print to screen or printer either a full or partial report. I can search, for example, for all entries containing "VISA" or "Jazz" or both. Other logical operators are not supported.

The software lends itself readily to files not usually associated with accounting. For instance, one of the suggested shoeboxes is "Coupon Organizer," with major categories such as "Cereals" and "Beverages," specific brands as the tags and the expiration date of the coupon as the date. The running total would be the value of all the coupons.

My wife immediately thought of starting a file for the high school yearbook she sponsors, using fund raising activities as the major categories and student names and methods of billings as some of the possible tags. My son experimented with tracking his extensive book and comic collection.

Though certainly not suitable for business accounting, *Shoebox* is worthy of consideration as a personal accounting system, especially for the price. The only real complaint I had involved the rather untidy screen displays. A call to Levins, however, assured me that this problem had been resolved in newer packages.

In conclusion, *Twentieth Century Shoebox* is an easily-mastered program which functions quickly and smoothly. While not intended for formal accounting, it would surely help in organizing a variety of personal information.

(Levins Engineering, Inc., 1802 Greenwich Woods Drive, Silver Springs, MD 20903, 301-564-8333, \$29.95 plus \$3 S/H.)

— Pat Pugliano

Software

1000/1200/2000/3000

## Super Utility Helps Recover Lost Data

Now you see it — now you don't! Fun if you're at a magic show but not so much fun if you just lost your software review for PCM or my other favorite magazine, *The Rainbow*. I sure need some super help now. Why not *Super Utility* by PowerSOFT.

Yes, your favorite Tandy Model I, III and IV utility is now available for the Tandy 1000, 1200, 2000 and 3000 and other IBM compatible computers. This is not *Super Utility Plus* ported over to IBM compatible machines; it is a completely new program. I have seen *Super Utility Plus* and believe me, Power-SOFT knows how to write utilities. *Super Utility*, called *SU* from here on, is meant primarily as a file recovery and disk media utility. It does not have features such as creating non-standard tracks in memory and then placing them on disks to copy protect them. You can, however, modify sector data and write it back to disk.

*SU* comes packaged in a nice vinyl 6 by 8½ inch portfolio. One inside pocket contains the disk and registration card while the other contains a 31-page manual. I found only one mistake in the manual and that was on Page 13 in the section "Sector Modification." The sample screen used is that of a "sector verify" not modify. No problem however, since these two screens are basically identical except for the "from" and "to" sector input required to verify a sector range.

*SU* works on fixed disks and cartridge systems such as the Iomega Bernoulli Box or Tandy Disk Cartridge System as well as floppy disks. An install routine is included for those who might have certain other fixed disk

**"This is not *Super Utility Plus* ported over to IBM compatible machines; it is a completely new program."**

configurations. Those included are Great Lakes Computer Peripherals, Mercury Megabank Hard Disk and Pegasus Hard Disk. *SU* may be displayed on a color or monochrome monitor. The manual states that if any screens look unusual (missing backgrounds), remove any ANSI.SYS files you might have in your CONFIG.SYS file and reboot the system.

As the copyright and title screen appear, a message at the bottom of the

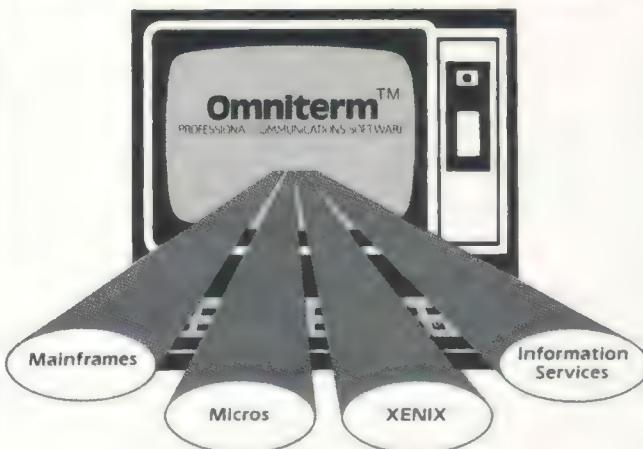
screen instructs you to press ESC if the display is not readable. This usually occurs with a monochrome monitor on a system with a color card in it. Pressing ESC as instructed solved the problem.

Before the main menu appears, *SU* displays the message "please wait, analyzing system volumes." The main menu then displays either six or seven options based on what type disk drives are found on the system. With no fixed disks on the system, there are six options, the sixth being "Quit." With a fixed disk attached, Option 6 becomes "Custom Volume Configuration" and "Quit" becomes Option 7. The remaining options are Disk Maps, Sector Modify, Directory and File Changes, Sector Copy and Sector Verify.

Choosing "Disk Maps" will present you with a sub-menu which is again dependent upon your system configuration. The options are Volume Dimension Graphic, DOS Volume Information Maps, Fixed Disk DOS Information Map, Fixed Disk DOS Partition Graphic and Return to Menu.

I tried using *SU* on four different machines with four different drive configurations. The first, of course, was

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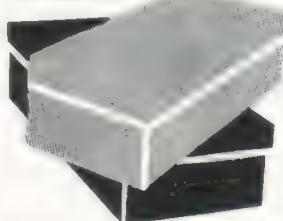
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my trusty Tandy 1000 with two floppy drives and a RAM drive installed. The second was an IBM PC with a 20-meg Bernoulli Box and two floppies. The third was an IBM PC-AT with two floppies and a 20-meg internal fixed disk. The fourth was a Tandy 1200 with one floppy and a 10-meg internal fixed disk.

The Tandy 1000 configuration displayed as three floppy drives, the IBM PC as two internal floppy drives and two external floppy drives, the IBM PC-AT as two floppies and an internal fixed disk, and the Tandy 1200 as a single floppy (designated as 1 instead of A) and one internal fixed disk.

When using the PC-AT and the Tandy 1200, the Custom Volume Configuration option never appeared on the main menu. Also, options 3 and 4 of the Disk Maps sub-menu did not appear while using the PC-AT but they were available when I tried using the Tandy 1200. I do not know if the DOS FDISK routine had been run on the PC-AT. A single DOS partition appeared to exist on the Tandy 1200.

The Volume Division Graphic option displays the device name, type, number

of DOS volumes, total storage for all volumes of this type and a bar graph representing percent full for the first volume. Pressing the space bar displays each successive volume.

The DOS Volume Information Map gives the same data plus 12 detailed features such as total data sectors, bytes per cluster, number of FATs, logical unit number and several others. Here you may use the arrow keys to change between Drives A and B. Pressing the space bar brings up the next two volumes. A RAM drive displays exactly like a physical drive.

Option 3 displays like Option 1 but without the graphics. In addition, each partition is displayed with its start and end sectors, size in megabytes, percent used and status (active/non-active). Option 4, DOS Partition Graphic, displays total sectors, number in use, number available and the bar graph. Option 5 returns you to the main menu.

Selecting option 2, Sector Modify, displays all active volumes and asks with which one you wish to work. Then a menu is displayed along the bottom of the screen which allows you to find, change, next, last, repeat, search and

quit — simply type the first letter.

"Find" requests a sector number to locate, while "Search" prompts you for an ASCII string. Characters outside the ASCII range may be entered by using the ALT key and decimal number from the keypad. The search begins from the first data sector, or the last sector found using the find command, and continues through the last sector on the disk. Press any key and the search will be terminated. A list of all sectors and the relative position within the sector where the string is found is then displayed.

"Next" and "Last" step forward and back through the sectors, while "Repeat" followed by "Next" or "Last" will continuously step through sectors until you press a key.

"Change" allows you to alter a sector and save it back to disk. You may change data either in Hex or ASCII mode by toggling with the F5 key. All 512 bytes of the sector are displayed at one time.

"Directory and File Changes" also requests a volume to work with and then displays all files and sub-directories on the chosen volume. Displayed are the type (file or sub-

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 HEXDUMP -- Display file in hex and character format.  
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directory), filename, time, date, size, FAT-entry, hide, R/O (read only) and system along with the volume name if one is present.

You may change the filename, volume name, hidden, read only and system attributes if you wish.

The arrow keys are used to select a file or sub-directory. The F1 key will then display the FAT for the selected file; F2 will display the FAT for the entire volume; F3 will enter the sector modify mode displaying the first sector of the file; and page-up and page-down will move between the root directory and the selected level of sub-directory.

File restoration is done from this option. Deleted files display with their file type flashing and the first character of their filename missing. For some reason the file type did not flash when using the Tandy 1200, however the first character of the filename was missing. Entering the first character of the filename places you in the restore mode. Everything known about the file is displayed, even down to a guess as to whether the file was ASCII or non-ASCII. The first sector of the first possible cluster is placed on the screen

for you to examine. You may press ENTER to restore, use PG UP or PG DN to examine other sectors in the cluster or use ESC to cancel the restoration process.

When in the auto-select mode the next possible cluster of the proper type (ASCII or non-ASCII) will be displayed if you choose to restore. Turn auto-select off with the F4 key and you may examine all available clusters regardless of type. You may choose the clusters to restore. The number of clusters restored and the number still required is displayed. If all clusters cannot be restored, you may use the /F option of CHKDSK to adjust the file size in the directory and the FAT. This is primarily for use on ASCII files.

If the first cluster has already been used, *SU* will display a message of sympathy and suggest using the search function and Option 4, Sector Copy. This option will copy sectors to a file. It prompts for an output filename, and if one is not specified, it defaults to COPYnnnn.CHK just as the CHKDSK command in DOS. Next specify an output volume and finally the volume and sectors to copy. You may be able to

recover portions of a file using this method.

Option 5, Sector Verify, simply requests a volume and the range of sectors to verify. Errors are indicated by a beep and the sector number will be displayed.

I could not test Custom Volume Configuration for two reasons. First, it did not appear as an option on any machine I used and second, a warning in the manual states that this option will delete every entry on that volume.

Overall, *Super Utility* performs very well. It is very simple to use and completely menu oriented. As advertised, it does not take a programmer to use. Most terms are defined in a glossary but the numbers displayed on a volume or file FAT take some understanding of disk and file structures. Even without this understanding though, file restoration is made quite simple, as long as the file has not been written over, with step-by-step instructions. *Super Utility* is an excellent package. Lose a few days work and judge for yourself.

(PowerSOFT, 17060 Dallas Parkway, Suite 114, Dallas, TX 75248, \$89.95)

— Larry Birkenfeld



# BARBAROSSA

## The War in Russia 1941-44

ARK ROYAL'S most popular Color Computer wargame is now available on the Tandy 1000 and all IBM compatibles. Hi-res graphics, 100% ML, Barbarossa is the same game raved about in the RAINBOW and HOT COCO (Jan '86), except that the 1000's memory allows room for a host of expanded features. Included are bitmapped logical characters (tanks, infantry, airflettes, cities and terrain), normal and Blitkrieg movement, airstrikes, supply consideration, unit detail, group transfer, weather, intelligence, (which even tells you which sector your attacking unit is in), patrols, game save and even more. \$24.95, disk. We pay shipping and handling on all prepaid orders in USA. COD charge is \$2.50. Personal checks in US accepted with no shipping delays. Foreign orders send M.O. in US funds. FL residents add 5% sales tax.

Program requires disk, graphics card, 128K.

P. O. Box 14806  
Jacksonville, FL 32238  
(904) 786-8603

## Clipper Compiles dBase III Programs

As a long-time advocate of *dBase II* and *dBase III* as a professional software development tool, I was very happy to hear about Nantucket's *Clipper*, a *dBase III* program compiler. If what the advertising claimed was factual, programs written with *dBase III*, when compiled with *Clipper*, would run two to 20 times faster than when run using the *dBase III* interpreter.

Much to my surprise, the advertising was honest. While most procedures didn't run 20 times faster, a speed increase of 300 percent (three times faster) was not uncommon. I was sold.

### What does *Clipper* do?

In addition to allowing the user to enter commands from the keyboard and execute them at that moment, *dBase III* allows more sophisticated users or programmers to put together many commands into "procedure" (program) files which may then be executed by entering a single command. This automates *dBase* so it can perform complicated tasks without the end-user entering a single *dBase* command or even knowing anything about *dBase*.

When you are running a *dBase III* program, *dBase* reads the procedure file one line at a time and "interprets" the commands. That is, it converts each command into instructions that the microprocessor in the computer can understand. Even though this is done at very high speeds, the time it takes to interpret each single command in a *dBase* procedure file each time the user runs the program adds up significantly.

*Clipper* is a *dBase III* compiler. A compiler is a program that takes high-level programs (those that are close to English, such as *dBase III*) and converts them into a language that the computer's microprocessor can understand without interpretation. The result is, since the "compiled" programs don't have to be interpreted for the microprocessor each time they are run, they will execute much faster.

Another benefit of this is that the compiled programs can be run without

*dBase III* or *Clipper*. That is, they are stand-alone machine language programs. While it is beneficial to have *dBase III* when developing the programs, the compiled *dBase III* programs may be distributed without *dBase III* itself. This can amount to a big savings if the compiled programs are to be run on more than one machine.

### Compatibility

*Clipper* will compile just about any *dBase III* program on the first try. The only problems I experienced when using *Clipper* were with certain "macros" and the compilers aversion to using dashes (-) in filenames.

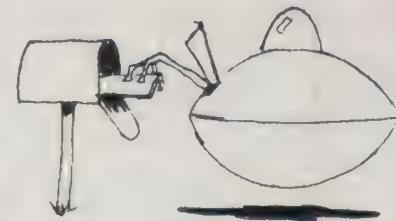
*Clipper* adds some very useful commands and features to *dBase III*. Among these are the much-needed *INKEY( )* function; a *VALID* clause for *GET* statements to check for proper user input; multi-child relations with *SET RELATION TO*; a real-time debugger which lets the programmer set breakpoints, check variables and fields, single-step programs and enter new values for variables while the program is running; extended support of the programmable function keys; in-memory screen swapping; and a very nice method for defining your own string and math functions. This is just to name a few!

The only problem with using the new commands provided by *Clipper* is, since *dBase III* does not support these new commands, your program will no longer run un-compiled using *dBase III*. In other words, you'll be unable to test programs with the *dBase III* interpreter before going through the time-consuming process of compiling. I found this a fair trade since the new *Clipper* commands reduced programming time and allowed me to add features to my programs that I was unable to offer using straight *dBase III*.

*Clipper* has its own, more-efficient indexing system which is incompatible with *dBase III* indexes. Therefore, it is necessary to build all index files from within a *Clipper*-compiled program. To keep things from getting too confusing, *Clipper* uses the extension .NTX for its index files, while *dBase III* uses .NDX.

The documentation states that, while the *Clipper* compiler might not run on non-IBM compatible machines, the programs it compiles can be made to run on just about any MS-DOS machine that supports ANSI terminal commands. When I tried compiling and linking the programs using the supplied

# PCM



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ANSI driver, they wouldn't run correctly on any machine I tried — even the compatibles. Thus, as it stands, *Clipper* compiled programs will not run on a Tandy 2000, but will run on a 1000, 1200 or 3000.

### How it Works

Compiling *dBase III* programs with *Clipper* is a two-step process. The first step is to compile the program. This looks at the program code and decides what needs to be done to convert it to machine language. The next step is to link it. Linking puts together the necessary machine language routines to make a complete machine language program.

If your program uses DO or SET PROCEDURE TO commands to call other files, *Clipper* will automatically include these files in the compiled program. In other words, if you have a program system that includes a dozen programs, the end result will be a single machine language program.

A typical *dBase III* program will be about 130K when compiled. This number is not much higher or lower with larger and smaller source programs since the necessary machine language routines which are linked together during the linking process are not duplicated in the final compiled program.

If your application is too large to fit into the computer's memory when compiled, the linker supplied with *Clipper* allows you to split up the program into overlay files which are loaded from the disk when needed as the program runs.

If your program encounters an error while running, the actual line number of the source program is displayed along with some information about the nature of the error. This sort of error reporting is a significant plus for program development and is rare to find in compilers.

### Documentation

The *Clipper* manual we received for review was about half typeset pages and half computer-generated addendums. There was very little information on using the new commands and features or on using the linker. Most of what I learned about it was by using the manual as inspiration for experimenting. Perhaps the final version of the manual will be more concise.

### Copy Protection

The *Clipper* compiler is supplied on a single copy-protected disk. Another,

non-copy-protected disk contains the specialized *PLINK86* linker program. *Clipper* will not run directly from the distribution diskette, but must be installed on another floppy disk or a hard disk drive to work. A little more generous than most software vendors, Nantucket allows you to have up to four copies of *Clipper* installed on different disks. It also provides a "de-install" program for safely moving *Clipper* from one disk to another.

It is important to remember, though, that programs compiled with *Clipper* do not need either *Clipper* or *dBase III* to run, and Nantucket does not put any restrictions on the distribution of software compiled with *Clipper*. Therefore, *Clipper* can be used to develop programs that are to be run on many machines or even to be distributed commercially.

### Conclusions

*Clipper* is not for the casual *dBase III* user or the person who uses *dBase III* strictly on a command-level basis. But for the serious *dBase III* programmer, *Clipper* is a godsend. It makes programs run much faster, adds many useful programming and debugging features and frees our programs from *dBase III*. In fact, it is one of the nicest compilers I've used on a microcomputer for any language.

(Nantucket, 5995 S. Sepulveda Blvd., Culver City, CA 90230, 213-390-7923, \$695.)

— Danny Humphress

Hardware

1000/1200

## Supercharge your Tandy with MFB-1000 multi-function board

When the Tandy 1000 was introduced a little more than a year ago, I found only one major problem with the machine's design. That was the lack of ample expansion slots. You could not, for instance, have a 640K Tandy 1000 with both a modem and a clock/mouse — there wasn't enough room for all the cards. Instead, you would have to live without one of the functions, be content

to swap boards in and out, or look elsewhere for a computer.

On the IBM PC, this problem was quickly tackled by third party suppliers who designed "multi-function" boards — expansion cards that combine more than one feature and occupy a single slot in the computer. But these cards are usually too long to fit in the Tandy 1000's case and they used a memory addressing technique different from Tandy's. Would any of these manufacturers produce similar products for our favorite Tandy machine?

That day is here. PBJ, a long-time third-party supplier for Tandy-compatible products, has come to the rescue. Their MFB-1000 multi-function board combines the features of four boards (two 128K memory boards, RS-232 interface and clock) into one single card. The MFB-1000 comes with 128K memory (expandable to 512K), an RS-232C serial communications interface and a clock/calendar with battery backup.

In addition to working with the Tandy 1000, the MFB-1000 is also compatible with the Tandy 1200 and IBM PC. Instructions provided with the

board tell you how to change a jumper to make the memory addressing compatible with these machines.

One of the convenience features of the MFB-1000 is its built-in clock/calendar with battery backup. You

### **"the MFB-1000 is also compatible with the Tandy 1200 and IBM PC."**

simply install a supplied device driver on your diskette's CONFIG.SYS file (detailed instructions are provided), and your computer will automatically know the correct date and time when it boots.

Installation of the MFB-1000 is simply a matter of removing two screws on the front of your Tandy 1000, lifting off the cover, inserting the card in an available slot and replacing the cover. If you install more memory chips on the board, the instructions help you along

and tell you which jumpers you need to change.

The basic MFB-1000 comes with two banks of 64K chips for a total expansion of 128K (added to the built-in 128K in the Tandy 1000). These chips may be replaced with the newer 256K chips for 256K or 512K on the board. The 64K and 256K chips cannot be mixed on the board, however. In other words, if you are using 256K chips in one bank, the other bank must be empty or be filled with 256K chips.

The RS-232C serial communications adapter is pre-configured as COM1 and cannot be changed. If you are using another communications device, it must be changed to COM2 to prevent interference with the MFB-1000 board.

PBJ has done a fine job on this board. The installation was quick and simple. In a matter of minutes, my machine went from a plain 128K Tandy 1000 to a supercharged 640K machine with communications and an automated ticker.

**(PBJ, Inc., 503 East 40th Street, Patterson, NJ 07504, (201) 523-8663, \$359.95)**

— Danny Humphress

## **Submitting Material To PCM**

Contributions to PCM are welcome from everyone. We like to run a variety of programs that will be useful/helpful/fun for other Tandy Portable and MS-DOS computer owners. We now support the Tandy portable models 100, 200 and 600 and the Tandy 1000, 1200, 2000 and 3000 MS-DOS computers.

Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

Pay for submissions is based on a number of criteria. The rate of remuneration will be established and agreed upon prior to publication.

For the benefit of those who wish more detailed information on making submissions, please send an SASE to: Submissions Editor, PCM, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

If you feel qualified to review software and/or hardware products for computers covered in PCM, send us your name, address and phone number; we will send you a questionnaire form and a copy of our reviewer guidelines.



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The following products recently have been received by PCM, examined by our magazine staff and approved for the PCM Seal of Certification, your assurance that we have seen the product and have ascertained that is what it purports to be. This month the Seal of Certification has been issued to:

**1-Hour Telecomputing**, a crash course in on-line computer communications. Discusses technical terms and features of available communications packages and computer services. *IM-PRESS*, 1412 Rosewood, Ann Arbor, MI 48104, (313)761-2231, \$19.95.

**The Computer Underground**, a book by M. Harry on computer hacking, crashing, pirating and phreaking. Discusses terminology and security measures for protecting computer systems and data. *Loompanics Unlimited*, P.O. Box 1197, Port Townsend, WA 98368, \$14.95.

**Connections: Telecommunicating on a Budget**, a book by Robert Chapman Wood for people new to computer communications. Discusses communications software and computer information networks. *Scott, Foresman and Company, Professional Publishing Group*, 1900 East Lake Avenue, Glenview, IL 60025, \$15.95.

**Cross Reference Facility**, a software development tool for BASIC programmers which will list report references to program variables. Requires Tandy 1000, 2000, 1200 or 3000. Program listing supplied only. Disk available at extra cost. *Cheapware*, Robert L. Nicolai, 4038 N. Ninth Street, St. Louis, MO 63147, (314) 621-7618, \$9.95.

**DMP-2100 Custom Font System**, allows you to create your own library of printer fonts or use a number of supplied fonts with Tandy's DMP-2100P printer. Re-

quires Tandy 1000, 1200, 2000 or 3000 and a DMP-2100 printer. Tandy, distributed through Radio Shack stores nationwide, Catalog No. 25-1158, \$24.95.

**Electronic Envelope**, a utility that allows you to prepare any computer file for distribution through electronic mail services. Converts binary files to ASCII for transmission and back to their original format after going through electronic mail. *MCTel*, Three Bala Plaza East, Suite 505, Bala Cynwyd, PA 19004, (800)628-3584, \$49.95.

**Key Entry III**, a high speed data entry software package. Provides easy-to-learn data entry and validation, editing and record searching. *Southern Computer Systems, Inc.*, 2732 7th Avenue S., Birmingham, AL 35234, (205) 933-1659, \$895., plus shipping.

**Kleen Line MPS(22)-4**, protects your computer and modem from electrical and phone line power surges and general "line noise." Works with all Tandy AC-operated machines. *Electronic Specialists, Inc.*, 171 South Main Street, Box 389, Natick, MA 01760, (800) 225-4876, \$201.95.

**Kleen Line PDS-11**, protects your modem from phone line

surges and noise. Works with all modems. *Electronic Specialists, Inc.*, 171 South Main Street, Box 389, Natick, MA 01760, (800)225-4876, \$73.95.

**The Lens**, a software package that allows an enlarged version of the monochrome display to be created on the color display. Requires Tandy 1200 or 3000 with both monochrome and color graphics displays and adapters. *ARTS Computer Products, Inc.*, 145 Tremont Street, Boston, MA 02111, (617) 482-8248, \$495.

**Logic Line I**, an aid to persons who wish to access and study as well as retrieve data from a large body of information or from textual material. Data can be retrieved independently of how it was input. Requires Tandy 1000, 1200 or 3000. *Clarity Software*, P.O. Box 839 Cheshireland, OH 44026, (216) 729-1132, \$250.

**Mastercom**, an easy-to-use smart terminal and file transfer utility program designed to be easy for beginners yet have the features for more experienced users. Requires Tandy 1000, 1200 or 3000. *The Software Store*, 706 Chippewa Square, Marquette, MI 49855, (906) 228-7622, \$49., plus shipping.

**PC Sweep**, a disk and file management program which allows the user to easily perform routine disk and file maintenance such as deleting, renaming, copying and making backups. Requires Tandy 1000, 1200, 2000 or 3000. *Koch Software Industries*, 11 West College Drive, Building G, Arlington Heights, IL 60004, (312) 398-5440, \$79.95.

**Project Scheduler**, aids in breaking down large jobs into individual tasks and keeping track of the project's progress. Requires Tandy 200. Tandy, distributed through Radio Shack stores nationwide, Catalog No. 26-3893, \$39.95.

**Text Power 200**, a text formatter that enhances the usefulness of the Tandy 200's internal Text function. Requires Tandy 200. *Tandy*, distributed through Radio Shack stores nationwide, Catalog No. 26-3881, \$39.95.

**Timeslips**, a time and expense tracking program with billing, reporting and graphics. Used to track and bill time-related costs and expenses for specific projects. *North Edge Software Corp.*, P.O. Box 286, Hamilton, MA, 01936, (617) 468-7358, \$99.95.

**X-TEL**, an advanced communications program for the Tandy 100 or 200. Supports on-line text editing and XMODEM communications protocol. Requires Tandy 100 or 200. *Sigea Systems, Inc.*, 19 Pelham Road, Weston, MA 02193, (617) 647-1098, \$50., plus \$5 shipping.

By awarding a *Seal*, the magazine certifies the program does exist, but this does not constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to PCM's reviewers for evaluation.

# Using BAREAD 2.1

Bar code listings must be read in numerical order beginning with Line 1 and continuing through the last line of the listing. The computer display is used to prompt you as to which line to scan and give you warning messages should you happen to get out of step.

When you run BAREAD, it asks you to scan the first line of the bar code listing. This line contains the name of the program as well as the beginning of the program itself. The computer will sound a high-

pitched beep whenever it's ready for you to scan a line. After a line has been successfully read, you'll hear a lower beep. A "blip-bloop" sound prompts you to turn your attention to the screen for a message. You'll hear this when you accidentally scan a line out of sequence.

After reading the first line, you continue scanning with the second line. Remember to wait for a high beep before scanning and then listen for a low beep to indicate a successful read.

Once the last line of the listing has been scanned, BAREAD will return control to the Tandy 100/200 menu screen. Note that the program you just scanned is now in the directory with a .DO extension.

The final step is to convert the .DO text file to a normal BASIC program. This is done quite simply by going to BASIC and loading the file with a command such as LOAD"TEST.DO" (if the program name were TEST). The program will load into BASIC and will be ready to run. To save the program in BASIC's compressed format (.BA extension), you'd type SAVE"TEST" (if the program were named TEST). You may then kill the .DO file with KILL "TEST.DO".

## BAREAD 2.1

```

1000 ' *** Initialize ***
1010 ON ERROR GOTO 1040
1020 CLEAR 1000:MAXFILES=2
1030 GOTO 1050
1040 IF ERR=5 THEN RESUME NEXT
1050 ON ERROR GOTO 9
1060 RUNM "B30F9"
1070 OPEN "WAND:" FOR INPUT AS #1
1080 UC$=-1
1090 PCS$="0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ
UVWXYZabcdefghijklmnopqrstuvwxyz":$+
1100 DIM RW$(36)
1110 ER$(1)="You must scan line 1 first!
"
1120 ER$(2)="You've SKIPPED a line!"
1130 ER$(3)="You've ALREADY SCANNED this
line!"

```

```

1140 ER$(4)="Code not PCM2/39 format!"
1150 ER$(5)="Command not applicable here
!"
1160 ER$(6)="You cannot skip this line!"
1170 ER$(7)="Selected resume file not in
computer!"
1180 ' *** Read Reserved Words List ***
1190 DATA BEEP,CLEAR,CLOSE,DATA,DEFDBL,D
EFINT,DEFNG,DEFSTR,ELSE,GOSUB,GOTO
1200 DATA INKEY$,INPUT,INSTR(,LCOPY,LEFT
$(,LINE(,LOADM,LPRINT,USING,MAXFILES
1210 DATA MID$(,NEXT,PEEK,POKE,POWER,PRE
SET(,PRINT,READ,RESTORE,RETURN,RIGHT$(,
1220 DATA SOUND,SPACE$(,STRING$(,THEN
1230 FOR I%=1 TO 36:READ RW$(I%):NEXT I%
1240 ' *** Procedure Begins Here ***
1250 CLS:PRINT@44,"PCM Bar Code Program
Reader v2.1"
1260 LINE(20,4)-(219,18),1,B:LINE(22,6)-
(217,16),1,B

```

```

1270 NN$=1
1280 GOSUB 1660:IF ER$>0 THEN GOSUB 1620
GOTO 1280
1290 IF LL$=0 AND INSTR("YN",IL$)>0 THEN
ER$=5:GOSUB 1620:GOTO 1280
1300 IF LL$=0 THEN ON INSTR("ALSR",IL$)
GOTO 1820,1890,1980,2050
1310 IF LL$=1295 THEN 1350
1320 IF LL$<>NN$ AND NN$=1 THEN ER$=1:GO
SUB 1620:GOTO 1280
1330 IF LL$<NN$ THEN ER$=3:GOSUB 1620:GO
TO 1280
1340 IF LL$>NN$ AND NN$>1 THEN ER$=2:GOS
UB 1620:GOTO 1280
1350 IL$=RIGHT$(IL$,19)
1360 IF LL$=1 AND NN$>0 THEN GOSUB 1780
1370 CL$=CL$+IL$
1380 FOR I%=1 TO LEN(CL$)
1390 CH$=MID$(CL$,I%,1)
1400 IF CH$="*" THEN GOSUB 1510:IF NL
$ THEN 1470 ELSE GOTO 1440
1410 IF CH$="/" THEN GOSUB 1550:IF NL
$ THEN 1470 ELSE GOTO 1440
1420 IF CH$=" " THEN UC$=NOT(UC$):GOT
O 1450
1430 IF CH$=>"A" AND CH$<="Z" AND NOT
(UC$) THEN CH$=CHR$(ASC(CH$)+32)
1440 XX$=XX$+CH$:IF RIGHTS(XX$,1)=CHR
$(13) THEN PRINT#2,XX$,:XX$="":UC$=-1
1450 NEXT I%
1460 CL$=""
1470 PRINT@200,SPACE$(80):
1480 IF LL$<>1295 THEN NN$=LL$+1:GOTO 12
80
1490 ' *** Done ***
1500 CLOSE:CALL 618071:CLEAR 500,HIMEM:MEMU
1510 ' *** Decode Reserved Word ***
1520 NL$=0:IF I%>LEN(CL$)-1 THEN NL$=-1:CL$="*":GOTO 1540
1530 I%=I%+1:CH$=RW$(INSTR(PCS,MID$(CL$,
I%,1)))
1540 RETURN
1550 ' *** Decode Hex and Control Charac
ters ***
1560 NL$=0:IF I%>LEN(CL$)-1 THEN NL$=-1:CL$="/"":GOTO 1610
1570 I%=I%+1:IF INSTR("/%.",MID$(CL$,I%,
1))>0 THEN CH$=MID$(CL$,I%,1):GOTO 1610
1580 IF I%>LEN(CL$)-1 THEN NL$=-1:CL$=RI
GHT$(CL$,2):GOTO 1610
1590 HX$=MID$(CL$,I%,2):CH$=CHR$((INSTR(
"0123456789ABCDEF",LEFT$(HX$,1))-1)*16+I
NSTR("0123456789ABCDEF",RIGHT$(HX$,1))-1
)
1600 I%=I%+1
1610 RETURN
1620 ' *** Error Codes ***
1630 SOUND 5000,10:SOUND 8000,10:SOUND 5

```

```

900,10
1640 PRINT@220-.5*LEN(ER$(ER$)),ER$(ER$)
;
1650 RETURN
1660 ' *** Get Code Line ***
1670 PRINT@173,"";:PRINT USING "Scan lin
e ####";NN$
1680 IF NN$=-1 THEN PRINT@173,"Scan any
line":GOTO 1700
1690 SOUND 500,5
1700 INPUT#1,IL$:ER$=0
1710 FOR I%=1 TO LEN(IL$)
1720 IF MID$(IL$,I%,1)="!" THEN MID$(IL$,
I%,1)=""
1730 NEXT I%
1740 IF LEN(IL$)<>1 AND LEN(IL$)<>21 THE
N ER$=4:RETURN
1750 IF LEN(IL$)=1 THEN LL$=0:RETURN
1760 LL$=LEFT$(IL$,2):LL$=(INSTR("012345
6789ABCDEFGHIJKLMNOPQRSTUVWXYZ",LEFT$(LL
$,1))-1)*36+INSTR("0123456789ABCDEFGHIJKLM
NOPQRSTUVWXYZ",RIGHT$(LL$,1))-1
1770 RETURN
1780 ' *** Open Program File ***
1790 PNS=LEFT$(IL$,6):IL$=RIGHT$(IL$,LEN
(IL$)-6)
1800 OPEN PNS FOR OUTPUT AS #2
1810 RETURN
1820 ' *** Abort ***
1830 BEEP:BEEP:BEEP
1840 PRINT@200,"ABORT! Are you sure?";
1850 INPUT#1,ANS
1860 IF INSTR("YN",ANS)=0 THEN BEEP:PRIN
T@251,"Scan 'YES' or 'NO':":GOTO 1850
1870 PRINT@200,SPACE$(80):
1880 IF AN$="Y" THEN CLOSE:KILL PNS+":DO
":GOTO 1490 ELSE GOTO 1280
1890 ' *** Skip Line ***
1900 IF NN$=1 THEN ER$=6:GOSUB 1620:GOTO
1280
1910 BEEP:BEEP:BEEP
1920 PRINT@210,"SKIP! Are you sure?"
1930 INPUT#1,ANS
1940 IF INSTR("YN",ANS)=0 THEN BEEP:PRIN
T@251,"Scan 'YES' or 'NO':":GOTO 1930
1950 PRINT@200,SPACE$(80):
1960 IF AN$="Y" THEN NN$=NN$+1
1970 GOTO 1280
1980 ' *** Stop & Save ***
1990 BEEP:BEEP:BEEP
2000 PRINT@207,"STOP & SAVE! Are you sur
e?";
2010 INPUT#1,ANS
2020 IF INSTR("YN",ANS)=0 THEN BEEP:PRIN
T@251,"Scan 'YES' or 'NO':":GOTO 2010
2030 PRINT@200,SPACE$(80):
2040 IF AN$="Y" THEN 1490 ELSE GOTO 1280
2050 ' *** Resume ***
2060 IF NN$<>1 THEN ER$=5:GOSUB 1620:GOT
O 1280

```

```
0 1280
2070 PRINT@254, "Resume Mode",
2080 NN%-1:GOSUB 1660
2090 IF LL%-0 THEN ER%-5 ELSE IF LL%<>1
THEN ER%-1
2100 IF ER%>0 THEN GOSUB 1620:GOTO 2060
2110 PNS$=MID$(IL$,3,6)
```

```
2120 ON ERROR GOTO 2140
2130 OPEN PNS FOR INPUT AS #2:GOTO 2170
2140 RESUME 2150
2150 CLOSE #2
2160 ER%-7:GOSUB 1620:GOTO 1270
2170 CLOSE #2:OPEN PNS FOR APPEND AS #2
2180 NN%--1:GOTO 1280
```

## TSTATS.BCR (FROM PAGE 100)

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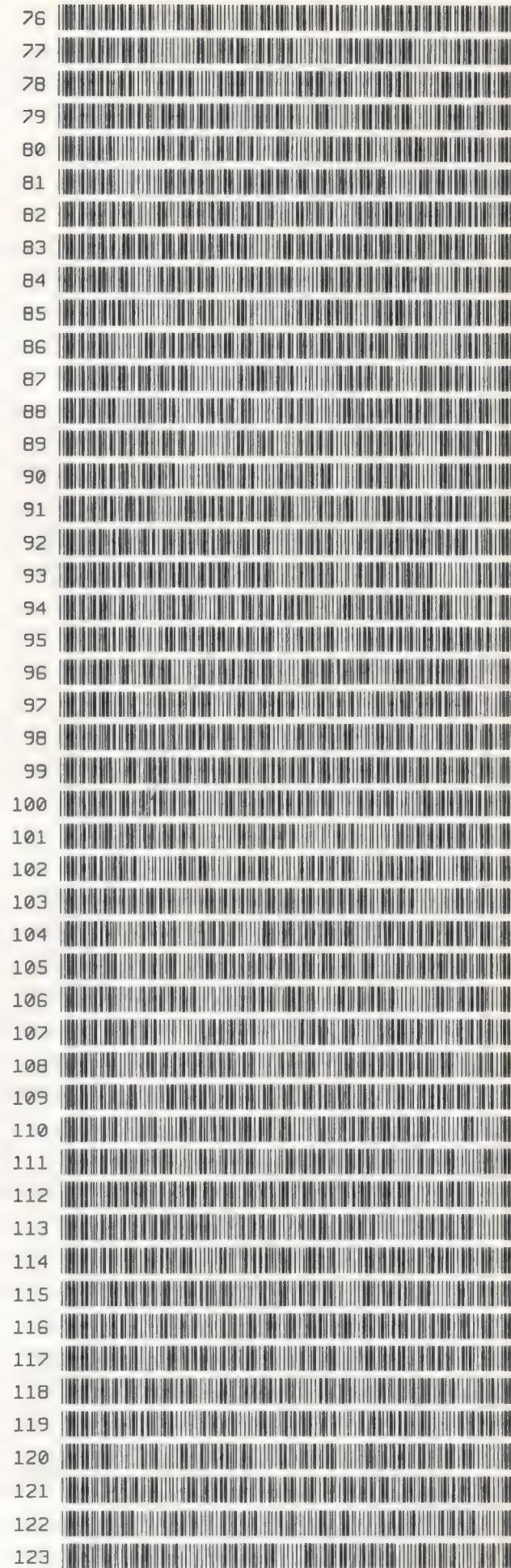
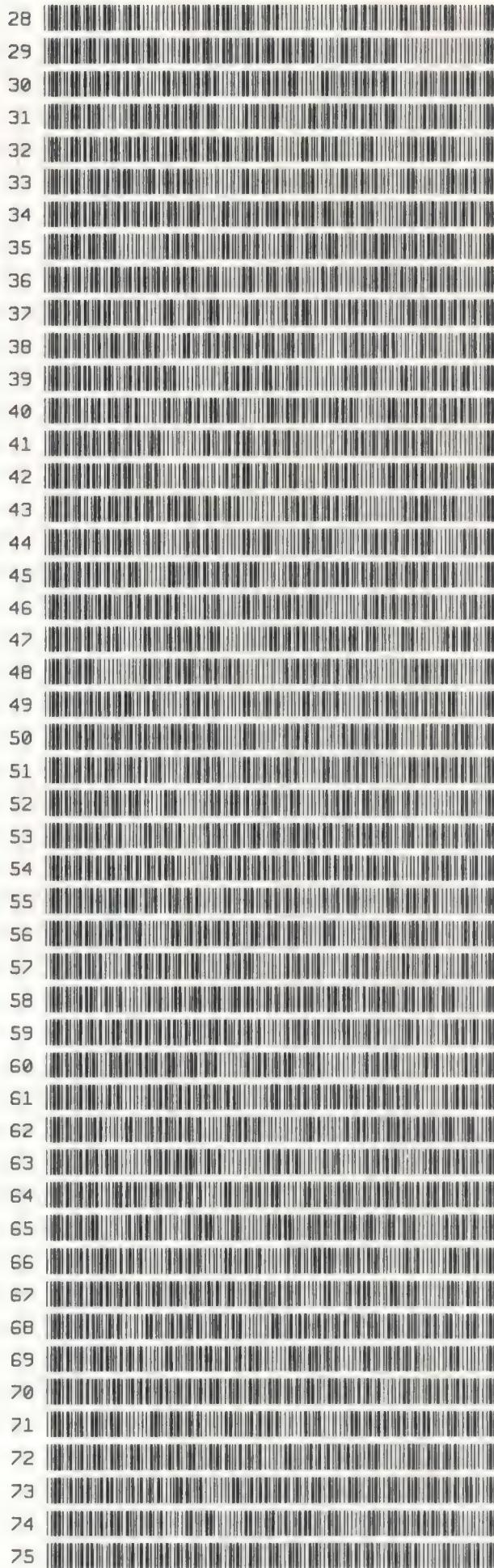
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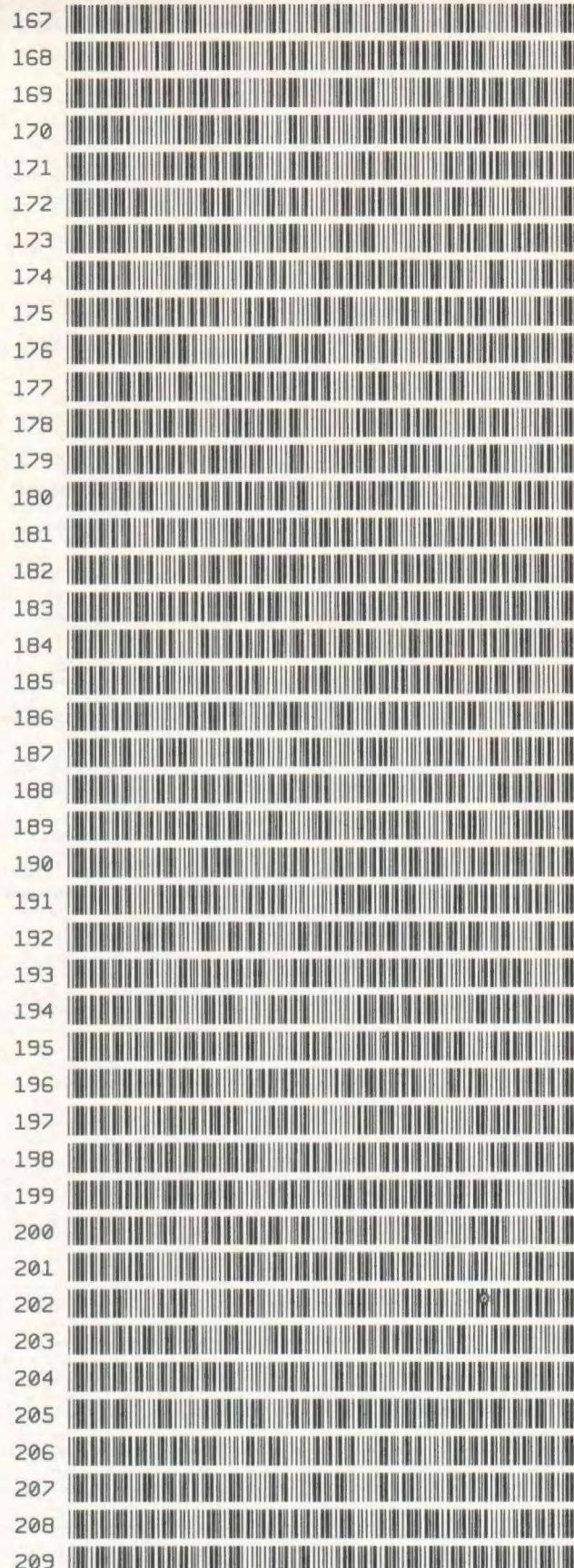
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### SARD.BCR (FROM PAGE 104)

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Abort



Skip Line



Stop & Save



Resume



Yes



No

|                   |                                |                       |                                 |                         |                                  |
|-------------------|--------------------------------|-----------------------|---------------------------------|-------------------------|----------------------------------|
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# PCMfest

Chicago

May 23-25

You're invited to PCMfest, a great show that's just for your Tandy computer. Sponsored by PCM, *The Personal Computer Magazine for Tandy Computer Users*, it's a wonderful way to meet and exchange information with those who share your interest in the new generation of Tandy computers.

You'll also discover the greatest variety of products ever for your computer because all of the favorites and a lot of new ones will be featured in the exhibits of PCM advertisers. Try out that new program and take it home that very day!

Along with other PCM readers, you'll meet the top national experts on your computer, including those who write for or who are written about in PCM. They will answer your questions on the spot.

PCMfest will also include a comprehensive lineup of free seminars on topics of immediate concern — and all of them designed to help you get the most out of your Tandy computer.

The Hyatt Regency Woodfield will be offering special rates (\$60, single or double room) for PCMfest. The show opens Friday evening with a 7 p.m. to 10 p.m. session. It's a daytime-only show Saturday — the exhibits open at 10 a.m. and run continuously until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 4 p.m.

Tickets may be obtained directly from PCM. We'll also send you a special reservation form so you can take advantage of the special room rate. Come to PCMfest and let's celebrate the new generation of Tandy computers!

**YES**, I'm coming to Chicago! I want to save by buying tickets now at the special advance sale price.

Please send me:

three-day tickets at \$9 each      total \_\_\_\_\_

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Make checks payable to: PCM. Mail to: PCMfest, The Falsoft Building, P.O. Box 385, U.S. Hwy. 42, Prospect, KY 40059. To make reservations by phone, call: (502) 228-4492.

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RAINBOWfest

Your admission to PCMfest also entitles you to attend RAINBOWfest, the highly popular show for the Tandy Color Computer which will run concurrently with PCMfest at the same location.

**Lucid Spreadsheet**

**SUPER ROM**

**Write ROM**

**Database**

**Outliner**



**NOW YOU CAN REALLY HAVE IT ALL!**

**All on one ROM. Truly the finest four programs available for the Model 100 — guaranteed.**

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